1984
STANDARD SPECIFICATIONS FOR CONSTRUCTION

c. Type IP, I(PM), IP-A, and I(PM)-A Pozzolan Cements.—These portland cements shall conform to the requirements of ASTM C 595.

d. White Cement.—This portland cement shall conform to requirements for Type I of ASTM C 150, except that it shall contain not more than 0.55 percent of ferric oxide (Fe_2O_3) by weight. The requirements for Gillmore setting time test and compressive strength through the 28-day test shall apply.

8.01.04 Masonry Cement.—Masonry cement shall conform to ASTM C 91.

8.01.05 Hydrated Lime.—Hydrated lime shall conform to ASTM C 207.

8.01.06 Ground Blast-Furnace Slag.—Ground blast-furnace slag shall conform to the requirements of ASTM C 989, Grade 100. It shall be used only as a blending material with Type IA or Type I portland cement, and only when approved on a project-by-project basis.

8.02 AGGREGATES

8.02.01 General Requirements.—Aggregates may be inspected at the producing plant and when received on the job. Such material shall not be used until approval has been received from the Engineer. Approval of aggregates at the producing plant does not constitute a waiver of the Department's right to reject them on the job. Aggregates which have been tested and approved for use in State work shall not be used in other work. When the circumstances require that the material be sampled from the hauling unit, the Contractor shall furnish a stairway and platform to provide safe access to the material in the hauling unit.

Aggregates shall be transported from the storage site to the work in vehicles so constructed and maintained as to prevent loss, contamination, or segregation of materials after loading and measuring.

8.02.02 Testing.—Testing will be accomplished by the specific methods specified throughout the Section and by the following general methods:

Sieve Analysis of Mineral Filler	AASHTO T 37
Sampling of Soils	AASHTO T 86
Particle Size Analysis of Soils	AASHTO T 88
Sieves (Square Openings)	ASTM E 11, E 323

The determination of deleterious particles will be done in accordance with Department methods.

Definitions of Terms.—Terms used in the inspection and testing of aggregates are defined as follows:

1. **Natural Aggregates.**—Natural aggregates shall be obtained from stone quarries, gravel deposits, or waste mine rock. Only such quantities of clay lumps and roots as are determined by the Engineer to have no deleterious effect upon the finished product will be permitted.

2. **Slag Aggregates.**—Slag aggregates are by-products formed in the production of iron, copper, and steel. When the word "slag" is used alone, it shall be understood to mean iron blast-furnace slag or reverberatory-furnace slag.

   Iron Blast-Furnace Slag is defined as a synthetic non-metallic by-product produced simultaneously with pig iron in the blast furnace; the slag consists principally of a fused mixture of oxides of silica, alumina, lime, and magnesia.

   Reverberatory-Furnace Slag is defined as the non-metallic by-product resulting from refining copper ore.

   Steel-Furnace Slag is a synthetic aggregate produced as a by-product of basic oxygen, electric, or open hearth steel-making furnaces; steel furnace slag consists principally of a fused mixture of oxides of calcium, silica, iron, alumina, and magnesia. Steel-furnace slag shall meet the same gradation and physical requirements as specified for iron blast-furnace slag and reverberatory-furnace slag.

3. **Soft Particles.**—Soft particles are those particles which are structurally weak or which are found to be non-durable in service. Soft particles include shale, siltstone, friable sandstone, ochre, coal, and clay-ironstone, except that clay-ironstone particles will not be classified as soft particles in the 9, 25, 28, and 31 Series aggregates used for bituminous mixtures and seal coats.

4. **Crushed Particles.**—A crushed particle is one which has at least one fractured face, except for those coarse aggregates where the size of the sieve on which the aggregate shall be retained before crushing is specified, in which case essentially all surfaces of the particle shall be fractured.

   Determination of crushed particles in aggregate produced by crushing portland cement concrete will be based on the presence of broken faces on the particle and not on the fact that it is a fragment broken from concrete.

All sandstone particles will be considered as crushed particles.

8.02.03 Coarse Aggregates for Portland Cement Concrete, No. 12 Bituminous Mixtures, and Bituminous Seal Coats.—Coarse aggregates for portland cement concrete, No. 12 bituminous mixtures, and bituminous seal coats (Michigan Series No. 6, 9, 17, 25, 26, 28, and 31) shall be obtained from natural aggregate or slag sources. Coarse aggregate produced by crushing portland cement concrete salvaged from the removal of concrete pavements, curbing, sidewalk, and similar structures from Department projects may be used in No. 12 bituminous mixtures other than top course mixtures and in portland cement concrete mixtures other than those requiring the use of 6AA aggregate.

The aggregates shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

Slag for concrete or bituminous coarse aggregate, conforming to the grading to be used in the mixture, shall have a unit weight of not less than 75 pounds per cubic foot as determined by ASTM C 29, Rodding Procedure.

Coarse aggregate produced by crushing concrete shall not be contaminated by base material picked up with the concrete. The presence of foreign materials, such as brick, wood, or plaster, in excess of 0.25 percent will be considered as evidence of contamination and shall result in rejection of the aggregate. Pieces of steel reinforcement may be present provided they pass the maximum sieve size of the grading without hand manipulation. The quantity of bituminous material in the crushed concrete shall not exceed 5 percent for aggregate to be used in concrete mixtures nor 15 percent for aggregate to be used in bituminous mixtures. A fragment of crushed concrete containing some bituminous material, soft particles, or chert will be considered as if the whole fragment was composed of the objectionable material. The crushed concrete shall conform to the physical requirements shown for gravel and stone in Table 8.02-2.

8.02.04 Dense-Graded Aggregates.—Dense-graded aggregates (Michigan Series No. 20, 21, 22, 23, and 35) shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

The 20 Series and 35A aggregates are used in bituminous mixtures.

The 21AA, 21A, 22A, and 23A aggregates are used for

aggregate base course, aggregate surface course, aggregate shoulders, and aggregate approaches.

Dense-graded aggregate shall consist of gravel, stone, slag, or crushed concrete, in combination with fine aggregate as necessary to meet the gradation requirements.

Dense-graded aggregate produced by crushing portland cement concrete shall not contain building rubble as evidenced by the presence of more than 1.0 percent brick, wood, plaster, or similar materials. Pieces of steel reinforcement may be present provided they pass the maximum sieve size of the grading without hand manipulation. The crushed concrete shall conform to the physical requirements shown for gravel and stone in Table 8.02-2.

When producing bituminous mixtures for top courses, aggregate produced by crushing portland cement concrete will not be permitted for the portion of the 20 Series aggregate coarser than the ⅜ inch sieve.

The portion of the 20 Series aggregates passing the ⅜ inch sieve shall be natural sand, stone sand, slag sand, sand produced by crushing portland cement concrete, or stamp sand. Only a negligible amount of organic material will be permitted. When producing bituminous mixtures for top courses, the amount of stone sand from crushed carbonate (limestone or dolomite) sources shall not exceed 10 percent of the total weight of the aggregate in the mix.

The material shall be stockpiled in such manner that the material may be removed from the stockpile by methods which will provide aggregate having a uniform gradation.

8.02.05 Open-Graded Drainage Course (OGDC) Aggregates.—OGDC aggregates shall conform to the grading requirements in Table 8.02-1, the physical requirements in Table 8.02-2, and the following additional requirements.

OGDC aggregate shall be obtained from natural aggregate, crushed concrete, iron blast-furnace slag, or reverberatory-furnace slag sources.

Aggregate from crushed concrete shall be produced by crushing concrete salvaged from highway-type structures such as pavements, curbing, gutters, and sidewalks. The salvaged concrete shall not be contaminated by base material picked up with the concrete. Presence of brick, wood, plaster, or similar materials in excess of 1.0 percent will be considered as evidence of contamination and shall result in rejection of the aggregate. Pieces of steel reinforcement may be present provided they pass the maximum sieve size of the grading without hand manipulation.

Table 8.02-1 Grading Requirements for Coarse Aggregates, Dense-Graded Aggregates, and Open-Graded Aggregates

1984

MATERIAL	MICHIGAN SERIES	CLASS	ITEM OF WORK BY SECTION NUMBER*	(a)	SIEVE ANALYSIS(b) (ASTM C 136) TOTAL PERCENT PASSING									PERCENT LOSS BY WASHING(b) (ASTM C 117)
					1½" 37.5mm	1" 25.0mm	¾" 19.0mm	½" 12.5mm	⅜" 9.5mm	No. 4 4.75mm	No. 8 2.36mm	No. 16 1.18mm	No. 30 0.60mm	
COARSE AGGREGATES	8	AA	5.05, 7.01, 7.03		100	95-100		30-60		0-8				1.0 max(c)
		A	7.01											
	9	A	7.10	1¼"	100	95-100	70-90		15-35	5-15				5.0 max
	17	A	7.01			100	90-100	50-75		0-8				1.0 max(c)
	25	A	4.06, 7.10, 7.11	1"			100	95-100	60-80	5-30	0-12			3.0 max(d)
		B	4.06											
		C	4.06											
	26	A	7.03				100	95-100	80-90	5-30	0-12			3.0 max
	28	B	4.06					100	95-100	25-50	0-15			3.0 max
		C	4.06					100	85-100	20-60	0-25			3.0 max
	31	A	4.06, 5.06, 7.10, 7.11	1"				100	95-100	35-65	0-25			3.0 max(d)
		C	5.06, 7.11	⅜"										
DENSE GRADED AGGREGATES	28	AAA	7.10				100	95-100	65-90	55-75	45-65		20-40	0-7(d)
		AA	7.10, 7.11				100	95-100	65-90		45-65		20-40	0-7(d)
		A	7.10, 7.11				100		65-85		40-60		20-35	0-7(d)
		B	7.10, 7.11				100		60-90		40-65		20-40	2-10(d)
		C	7.10		100	90-100			55-85		30-60		15-40	0-10(d)
	21	AA	3.01, 4.03		100	85-100		50-75			20-45			4-8(d)(e)
		A	3.01, 4.03											
	22	A	3.01, 3.08, 3.09, 4.03			100	90-100		65-85		30-50			4-8(d)(e)(f)
	23	A	3.08, 3.09			100			60-85		25-60			9-16(d)
	35	A	7.10, 7.11						100	65-85	45-65		20-40	0-7(d)(g)
OPEN-GRADED AGGREGATES	5	G	2.08, 6.02		100			0-90		0-8				3.0 max
	8	G(M)	2.08, 6.02		100		52-100		38-65	8-40		0-12	0-8	5.0 max
	34	G	2.08, 6.02					100	90-100		0-5			3.0 max

(a) Material before crushing shall be retained on the specified sieve.
(b) Based on dry weights. The limits for Loss by Washing of dense-graded aggregates are significant to the nearest whole percent.
(c) Loss by Washing of 2.0 percent permitted for material produced entirely by crushing rock, boulders, cobbles, slag, or concrete.
(d) Quarried Carbonate (limestone or dolomite) aggregates shall not contain over 10 percent insoluble residue finer than the No. 200 sieve.
(e) When used for aggregate base courses and the material is produced entirely by crushing rock, boulders, cobbles, slag, or concrete, the maximum limit for Loss by Washing will be increased to 10 percent.
(f) For aggregates produced from sources located in Berrien County, the Loss by Washing shall not exceed 8 percent and the sum of Loss by Washing and shale particles shall not exceed 10 percent.
(g) When free of clay and silt and the material is produced entirely by crushing rock, boulders, cobbles, slag, or concrete, the maximum limit for Loss by Washing will be increased to 9 percent.
(h) OGDC Aggregate 8G shall have a coefficient of uniformity (D60/D10) equal to or greater than 4. D60 is the maximum diameter of the smallest 60 percent, by weight, of the particles and D10 is the maximum diameter of the smallest 10 percent, by weight, of the particles.

*Item of Work:
2.06 Roadway Earthwork
3.01 Aggregate Base Courses
3.08 Aggregate Surface Course
3.09 Aggregate Shoulders and Approaches
4.02 Temporary Patching with Bituminous Material
4.06 Bituminous Seal Coats
5.05 Prestressed Concrete Beams
5.06 Waterproofing and Protective Covers
6.02 Underdrains
7.01 Portland Cement Concrete
7.03 Mortar and Concrete Patching and Resurfacing Mixtures
7.10 Bituminous Mixtures—Plant Mixed
7.11 Bituminous Patching Mixtures

Table 8.02-2 Physical Requirements for Coarse Aggregates, Dense-Graded Aggregates, and Open-Graded Aggregates 1984

MICHIGAN SERIES	CLASS	GRAVEL AND STONE(1)						SLAG(1)(2)	
		Crushed Material, min (3)(4)	Loss, max, Los Angeles Abrasion (AASHTO T 96)	Soft Particles, max (3)	Chert, max (3)(5)	Sum of Soft Particles and Chert, max (3)(5)	Freeze-Thaw Durability, min, (ASTM C 666, Procedure B)(6)(7)	Sum of Coke and Coal Particles, max (3)	Freeze-Thaw Durability, min, (ASTM C 666, Procedure B) (6)
6	AA		40	2.0(8)		4.0	20	1.0	20
	A		40	3.0(8)	7.0	9.0	20	1.0	20
9	A	95	40	5.0				1.0	
17	A		40	3.5(8)	8.0	10.0	20	1.0	20
25	A(9)	95	40	5.0				1.0	
	B	50	40	5.0				1.0	
	C		40	5.0				1.0	
26	A		40	2.0(8)		4.0	20	1.0	20
28	B	60	40	6.0				1.0	
	C	40	40	6.0				1.0	
31	A(9)	95	40	5.0				1.0	
	C	95	40	5.0				1.0	
20	AAA(9)	60	40						
	AA(9)	40	40						
	A(9)	25	40						
	B		40						
	C		50						
21	AA	95	50						
	A	25	50						
22	A	25	50						
23	A		50						
35	A(9)	60	40						
5	G	(10)	40(11)						
8	G	(10)	40(11)						
34	G	(10)	40(11)						

(1) All values in percent.
(2) Slag shall consist of clean, tough, durable pieces, reasonably uniform in density and quality. The aggregates shall contain no free (unhydrated) lime.
(3) Determined by dividing the wt. g'ts of the particles picked by the weight of that portion of the sample from which they were selected.
Clay-ironstone particles are included in the soft particles picked for the 6, 17, and 26 Series aggregates.
Clay-ironstone particles are not included in the soft particles picked for the 9, 25, 28, and 31 Series aggregates.
(4) The percentage of crushed material will be determined on that portion of the sample retained on all sieves down to and including the ⅜-inch sieve for Aggregate Series 21 and 22 and including the No. 4 sieve for Aggregate Series 5, 8, 9, 20, 25, 26, 31, 34, and 35.
(5) Particles with nodules of chert will be considered as chert.
(6) Aggregates intended for use in exposed concrete will be required to demonstrate, to the satisfaction of the Engineer, adequate freeze-thaw durability for the particular use, either by means of an extended field record of use in similar concrete which had similar exposure, or by accelerated laboratory freeze-thaw tests, or both.
(7) Where freeze-thaw durability testing results in a durability factor of less than 40, the Engineer may impose more restrictive requirements on the soft and/or chert particles based on Department methods, to ensure adequate durability for the material furnished.
(8) Clay-ironstone particles shall not exceed 1.0 percent for 6AA and 26A, and 2.0 percent for 6A and 17A.
(9) Aggregate used in the production of top course mixtures shall meet the Aggregate Wear Index (AWI) specified for the roadway. The AWI established for various aggregate sources will be based on wear track testing and/or petrographic analysis of representative samples of the aggregate. The Contractor may request approval to furnish an aggregate mixture which is a blend of an aggregate having a low AWI with an aggregate having a high AWI, the mixture shall be proportioned such that the mixture will have an AWI meeting, or exceeding, the AWI required for the roadway. The aggregates, the proportions to be used, and the procedures to be used for blending the aggregates shall be as approved by the Engineer.
(10) When used as Granular Blanket, aggregates 5G and 34G shall have a minimum crushed content of 90 percent and aggregate 8G shall have a minimum crushed content of 75 percent.
(11) The abrasion requirement applies to aggregates from any source (gravel, stone, crushed concrete, or slag).

8.02.06 Granular Materials for Fill and Subbase.— Granular materials for use as fill, trench backfill, subbase and filter aggregates shall consist of sand, gravel, crushed stone, foundry sand, iron blast-furnace slag, reverberatory-furnace slag, or a combination thereof conforming to the respective requirements specified herein. Granular material used in the construction of subbase may be produced from salvaged concrete provided that it meets the grading requirements and contains only negligible steel reinforcement.

When Class II material is specified, Class I material may be substituted. When Class III material is specified, Class I or Class II material may be substituted.

Material which may be cementitious or not suitable for water percolation shall not be used. Only such quantities of shale particles as are determined by the Engineer to have no deleterious effect will be permitted.

When used for trench backfill, no stones larger than 2 inches shall be placed within 12 inches of the pipe.

Foundry sand shall be free of combustible material and may contain only negligible quantities of iron. It shall not be used for filling over or around underdrain pipe, metal utility service pipes, or conduits.

Table 8.02-3 Grading Requirements for Granular Materials

MATERIAL	SIEVE ANALYSIS (ASTM C 136) TOTAL PERCENT PASSING‡									Percent Loss by Wash-ing (ASTM C 117)
	6"	3"	2½"	2"	1"	½"	No. 4	No. 30	No. 100	
	150mm	75mm	63mm	50mm	25mm	12.5mm	4.75mm	0.60mm	0.150mm	
Class I				100	-	45-85	20-65	5-30		0-5
Class II*			100			60-100			0-30	0-7†
Class IIA*			100			60-100			0-35	0-10†
Class III		100	95-100							0-15†

! Based on dry weights.
* Except for use in Granular Blankets, Class IIA granular material may be substituted for Class II granular material for projects located in the following counties Arenac, Bay, Genesee, Gladwin, Huron, Lapeer, Macomb, Midland, Monroe, Oakland, Saginaw, Sanilac, Shiawassee, St. Clair, Tuscola, and Wayne counties.
† To be determined on that portion of the sample which passes the 1-inch sieve.

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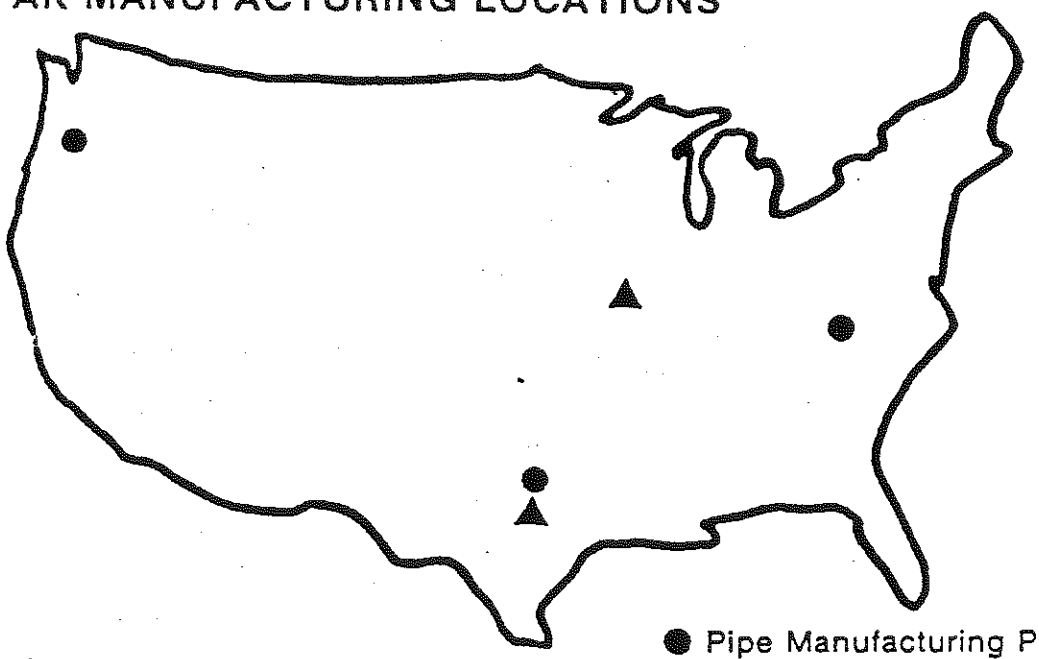


● Pipe Manufacturing Plants
▲ Fitting Manufacturing Plants

Distributed By:

Dimensions of Nipak PE 3408 High Density Polyethylene Pipe

TABLE 2

Nominal IPS Diameter (Inches)	Actual Outside Diameter (inches)	SDR 7.3 (250 PSI)*		SDR 9 (200 PSI)*		SDR 11 (160 PSI)*		SDR 13.5 (125 PSI)*		SDR 15.5 (110 PSI)*	
		Minimum Wall (Inches	Weight (lb/ft)	Minimum Wall (inches)	Weight (lb/ft)	Minimum Wall (inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)
2	2.375	0.326	0.908	0.264	0.757	0.216	0.634	—	—	—	—
3	3.500	0.480	1.970	0.389	1.645	0.318	1.379	0.259	1.141	0.226	1.006
4	4.500	0.616	3.251	0.500	2.718	0.409	2.279	0.333	1.886	0.290	1.659
5	5.563	0.762	4.972	0.618	4.153	0.506	3.477	0.412	2.884	0.359	2.539
6	6.625	0.908	7.054	0.736	5.890	0.602	4.935	0.491	4.093	0.427	3.597
8	8.625	1.182	11.956	0.958	9.982	0.784	8.364	0.639	6.935	0.556	6.097
10	10.750	1.473	16.067	1.194	15.517	0.977	12.988	0.796	10.768	0.694	9.484
12	12.750	1.747	26.122	1.417	21.824	1.159	18.270	0.944	15.145	0.823	13.339
14	14.000	1.918	31.492	1.556	26.313	1.273	22.017	1.037	18.268	0.903	16.072
16	16.000	—	—	1.778	34.364	1.455	28.760	1.185	23.864	1.032	20.992
18	18.000	—	—	—	—	1.636	36.382	1.333	30.192	1.161	26.568
20	20.000	—	—	—	—	1.818	44.920	1,481	37.272	1.290	32.824
22	22.000	—	—	—	—	—	—	1.630	45.122	1.419	39.714
24	24.000	—	—	—	—	—	—	1.777	53.694	1.548	47.232

Nominal IPS Diameter (Inches)	Actual Outside Diameter (Inches)	SDR 17 (100 PSI)*		SDR 21 (80 PSI)*		SDR 26 (60 PSI)*		SDR 32.5 (50 PSI)*	
		Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)	Minimum Wall (Inches)	Weight (lb/ft)
3	3.500	0.206	0.922	0.167	0.756	—	—	—	—
4	4.500	0.265	1.525	0.215	1.252	—	—	—	—
5	5.563	0.327	2.327	0.265	1.908	—	—	—	—
6	6.625	0.390	3.305	0.316	2.709	0.255	2.207	0.204	1.780
8	8.625	0.508	5.604	0.411	4.588	0.332	3.742	0.266	3.022
10	10.750	0.633	8.703	0.512	7.123	0.414	5.815	0.331	4.687
12	12.750	0.750	12.231	0.608	10.032	0.491	8.180	0.393	6.600
14	14.000	0.824	14.754	0.667	12.085	0.539	9.860	0.431	7.948
16	16.000	0.942	19.276	0.762	15.779	0.616	12.878	0.492	10.369
18	18.000	1.059	24.381	0.858	19.987	0.693	16.299	0.554	13.135
20	20.000	1.176	30.083	0.952	24.643	0.769	20.097	0.615	16.201
22	22.000	1.294	36.412	1.048	29.840	0.846	24.320	0.677	19.618
24	24.000	1.412	43.343	1.143	35.504	0.923	28.946	0.738	23.330
28	28.000	1.647	59.017	1.333	48.342	1.077	39.405	0.862	31.790
30	30.000	1.765	66.75	1.429	54.68	1.154	44.54	.923	35.96
32	32.000	—	—	1.524	62.22	1.231	50.73	.985	40.91
36	36.000	2.118	97.522	1.714	78.74	1.385	64.21	1.108	52.538

*Pressure rating for water at 73.4°F, based on 1600 psi long term hydrostatic strength. See Table 17, page D-2 for additional pressure ratings.

Standard pipe lengths: 40 feet

Nipak high density polyethylene pipe is also available in coils in lengths up to 1,500 feet in eight diameters from ½" CTS to 2" IPS. 3" IPS pipe is available in coils up to 1000 feet long.

Metric sizes and special sizes are available on special order.

Although polyethylene can be deflected considerably, practical limitations of circular cleaning plugs and conventions have usually limited flexible pipe to 5% deflection. Table 23 provides the maximum allowable trench loads at 5% deflection for three different soils moduli. Earth loads for other deflection percentages will be in proportion to the values in Table 23; double for 10% deflection, half for 2.5% deflection. The 700 psi soil modulus is for 90% compaction. The 300 psi soil modulus is for 65% compaction. The 200 psi soil modulus is for loose, uncompacted fill which is uniformly placed around the pipe. A comparison of these loads with the backfill load versus backfill height of Figure 3 will determine the maximum trench depth for a particular diameter of pipe and soil modulus. With 700 psi soil modulus, the thinnest wall pipe (SDR 32.5) may be used if earthloading is the only consideration. With 300 psi soil modulus, it will be necessary for diameters over 18 inch to use SDR 21 or SDR 17 pipe or limit the trench depth. For example, an SDR 32.5 pipe of 24 inch diameter would be limited to a backfill height of 16 feet. With 200 psi soil modulus, only the smallest diameter, 6 inch, can be used with the SDR 32.5 pipe to the deepest depths. If backfill heights are limited to five feet, any diameter of SDR 32.5 may be used. For a ten foot limitation, SDR 32.5 could be used for pipe up to 10 inches; SDR 26 for pipe up to 14 inches; SDR 21 for pipe up to 22 inches and SDR 17 for the next larger diameter pipe.

The deflections were calculated from the modified Spangler formula, which is the currently best documented and best known design theory for the deflection of a cylindrical horizontal pipe under earth load. The formula is:

$$y = \frac{LKW'}{\frac{2E}{3\,(SDR - 1)^3 + 0.061\,E'}}$$

where y = vertical deflection of pipe in inches
L = deflection lag factor (1.50 for polyethylene)
K = bedding constant (conservatively 0.10 though a value of .083 is specified by good backfill practices)
W' = earth load on pipe in pounds/linear inch (W' = W/12)
E = modulus of elasticity for polyethylene, psi
E' = modulus of soil reaction, psi

The values of 1.50 for the deflection lag factor and 0.10 for the bedding constant come from the WPCF Manual of Practice No. 9 as do the values of the compacted soil moduli. The value of 200 psi is based on our search of the literature. If the soil is compacted to ASTM D-2321 recommended practices, the bedding angle would be 180° for a constant of 0.083. The long term modulus of elasticity of the polyethylene pipe is 30,000 psi from extensive laboratory testing. Since tests show that the deflection of buried polyethylene pipe stops after one year, (the time necessary for soil consolidation to be completed), the use of the 50 year 30,000 psi modulus is very conservative.

Chemical Resistance of Nipak Polyethylene Pipe

TABLE 24

CHEMICAL	75 F	100 F	125 F	150 F	175 F
Acetic acid 60%	———	———	———	———	.....
Acetic acid glacial	———	.....	.....	.....	
Acetone	———	———	.....	.....	
Aromatic acids	———	———	———	———	.....
Acrylonitrile	———	———	———	———	.....
Adipic acid	———	———	———	———	.....
Allyl alcohol	———	———	———	.....	.....
Alums	———	———	———	———	.....
Aluminum chloride	———	———	———	———	.....
Aluminum fluoride	———	———	———	———	.....
Aluminum sulfate	———	———	———	———	.....
Ammonia	———	———	———	———	.....
Ammonium acetate	———	———	———	———	.....
Ammonium carbonate	———	———	———	———	.....
Ammonium chloride	———	———	———	———	.....
Ammonium fluoride	———	———	———	———	.....
Ammonium hydroxide	———	———	———	———	.....
Ammonium nitrate	———	———	———	———	.....
Ammonium phosphate	———	———	———	———	.....
Ammonium sulfate	———	———	———	———	.....
Ammonium sulfide	———	———	———	———	.....
Amyl acetate	———	———	.....	.....	
Amyl alcohol	———	———	.....	.....	
Aniline	———	———	.....		
Antifreeze	———	———	———	———	.....
Antimony chloride	———	———	———	———	.....
Arsenic acid	———	———	———	———	———
Barium carbonate	———	———	———	———	.....
Barium chloride	———	———	———	———	.....
Barium hydroxide	———	———	———	———	.....
Barium sulfate	———	———	———	———	.....
Barium sulfide	———	———	———	———	.....

CHEMICAL	75°F	100°F	125°F	150°F	175°F
Battery acid	———	———	———	———	———
Beer	———	———	———	———	———
Beeswax	———	———	———	———	.....
Benzoic acid	———	———	———	———	.....
Borax	———	———	———	———	———
Boric acid	———	———	———	———	.....
Brine	———	———	———	———	———
Butane gas	———	———	———	———	.....
Butanediol	———	———	———	———	.....
Butanol	———	———	———	———	.....
Butyl acetate	———	———	.....	.....	
Butyl glycol	———	———	———	———	.....
Butyric acid	———	———	.....	.....	
Calcium carbonate	———	———	———	———	.....
Calcium chlorate	———	———	———	———	.....
Calcium chloride	———	———	———	———	.....
Calcium hydroxide	———	———	———	———	.....
Calcium hypochlorite solution	———	———	———	———	.....
Calcium nitrate	———	———	———	———	.....
Calcium sulfate	———	———	———	———	.....
Camphor	———	———	.....	.....	
Carbon dioxide	———	———	———	———	———
Carbon monoxide	———	———	———	———	.....
Carbonic acid	———	———	———	———	.....
Caustic potash	———	———	———	———	———
Caustic soda	———	———	———	———	———
Chloroacetic acid	———	———	———	———	.....
Chrome alum	———	———	———	———	.....
Chromic acid	———	.....	.....		
Chromic and sulfuric acid	———	.....	.....		
Citric acid	———	———	———	———	.....
Coal gas (benzene free)	———	———	———	———	.....
Coconut oil	———	———	———	.....	
Copper chloride	———	———	———	———	.....
Copper cyanide	———	———	———	———	.....
Copper fluoride	———	———	———	———	.....
Copper nitrate	———	———	———	———	.....

——— Acceptable

..... Conditional depending on operating pressures

TABLE 24 continued

CHEMICAL	75 F	100 F	125 F	150 F	175°F
Corn oil	———	———	———	·····	
Cottonseed oil	———	———	———	———	·····
Creosote	———	———	———	———	·····
Cresol	———	———	———	———	·····
Cyclohexane	———	———	———	———	·····
Cyclohexanol	———	———	———	———	·····
Cyclohexanone	———	———	———	·····	
Decalin	———	———	———	·····	
Detergents, synthetic	———	———	———	———	·····
Developers, photographic	———	———	———	———	·····
Dextrin	———	———	———	———	·····
Dextrose	———	———	———	———	·····
Dibutyl ether	———	·····	·····		
Dibutyl phthalate	———	———	·····	·····	
Dichloroacetic acid	———	———	———	·····	
Diesel oil	———	———	·····	·····	
Diethylether	———	·····	·····		
Diethylene glycol	———	———	———	———	·····
Dioxane	———	———	———	———	·····
Emulsions, photographic	———	———	———	———	·····
Esters, aliphatic	———	———	———	·····	
Ethanol	———	———	———	·····	·····
Ether	———	·····	·····		
Ethyl acetate	———	———	·····	·····	
Ethylene glycol	———	———	———	———	·····
Ferric chloride	———	———	———	———	·····
Ferric nitrate	———	———	———	———	·····
Ferric sulfate	———	———	———	———	·····
Ferrous chloride	———	———	———	———	·····
Ferrous sulfate	———	———	———	———	·····
Film solutions	———	———	———	———	·····
Fluoboric acid	———	———	———	———	·····
Fluosilicic acid	———	———	———	———	·····
Formaldehyde	———	———	———	———	·····
Formic acid	———	———	———	———	·····

CHEMICAL	75 F	100 F	125 F	150 F	175 F
Fruit juices	———	———	———	———	·····
Fuel oil	———	·····	·····		
Gasoline	———	———	·····	·····	
Gelatin	———	———	———	———	·····
Glucose	———	———	———	———	·····
Glycerine	———	———	———	———	·····
Glycol	———	———	———	———	·····
Heptane	———	———	·····	·····	
Hexane	———	———	·····	·····	
Hexanol	———	———	———	———	·····
Hydrobromic acid	———	———	———	———	·····
Hydrocyanic acid	———	———	———	———	·····
Hydrochloric acid	———	———	———	———	·····
Hydrofluoric acid 40%	———	———	———	———	·····
Hydrofluoric acid 60%	———	———	———	·····	
Hydrogen	———	———	———	———	·····
Hydrogen peroxide 30%	———	———	———	———	·····
Hydrogen peroxide 90%	———	———	———	·····	
Hydrogen sulfide	———	———	———	———	·····
Hypochlorous acid	———	———	———	———	·····
Iodine (alcohol solution)	———	·····	·····		
Isopropanol	———	·····	·····		
Isopropyl ether	———	·····	·····		
Lactic acid	———	———	———	———	·····
Lead acetate	———	———	———	———	·····
Linseed oil	———	———	———	———	·····
Magnesium carbonate	———	———	———	———	·····
Magnesium chloride	———	———	———	———	·····
Magnesium hydroxide	———	———	———	———	·····
Magnesium nitrate	———	———	———	———	·····
Magnesium sulfate	———	———	———	———	·····
Maleic acid	———	———	———	———	·····
Menthol	———	———	———	·····	
Mercuric chloride	———	———	———	———	·····
Mercuric cyanide	———	———	———	———	·····
Mercurous nitrate	———	———	———	———	·····

——— Acceptable

····· Conditional depending on operating pressures

TABLE 24 continued

CHEMICAL	75°F	100°F	125°F	150°F	175°F
Mercury	———	———	———	———	.....
Methanol	———	———	———	.....	
Milk	———	———	———	———	.....
Mineral oil	———	———	.....		
Molasses	———	———	———	———	.....
Naphtha	———	———	.....	.....	
Naphthalene	———	———	.....	.....	
Nickel chloride	———	———	———	———	.....
Nickel nitrate	———	———	———	———	.....
Nickel sulfate	———	———	———	———	.....
Nitric acid 0-30%	———	———	———	———	.....
Nitric acid 30-50%	———	———	.....		
Nitric acid 50-70%	———	.....	.....		
Nitrobenzene	———	.....	.....		
Nitrotoluene	———	.....	.....		
Oils and fats	———	———	———	———	.....
Oleic acid	———	———	———	.....	
Orthophosphoric acid 50%	———	———	———	———	.....
Orthophosphoric acid 95%	———	———	———	.....	
Oxalic acid	———	———	———	———	.....
Oxygen	———	———	———	———	.....
Ozone	.....	———	———	———	
Paraffin oil	———	———	———	———	.....
Perchloric acid 20%	———	———	———	———	.....
Perchloric acid 50%	———	———	———	.....	
Perchloric acid 70%	———	———	———	.....	
Petroleum	———	———	———	———	.....
Petroleum ether	———	.....	.....		
Phenol	———	———	———	———	.....
Phosphates	———	———	———	———	.....
Phosphoric acid	———	———	———	———	.....
Phosphorous oxychloride	———	———	———	———	.....
Phosphorus pentoxide	———	———	———	———	.....
Phosphorus trichloride	———	———	———	———	.....
Photographic solutions	———	———	———	———	.....
Phthalic acid	———	———	———	———	.....
Picric acid	———	———	———	———	.....
Potash	———	———	———	———	.....
Potassium borate	———	———	———	———	.....
Potassium bromate	———	———	———	———	.....
Potassium bromide	———	———	———	———	.....
Potassium carbonate	———	———	———	———	.....
Potassium chlorate	———	———	———	———	.....
Potassium chloride	———	———	———	———	.....
Potassium chromate	———	———	———	———	.....
Potassium cyanide	———	———	———	———	.....
Potassium dichromate	———	———	———	———	.....
Potassium ferricyanide	———	———	———	———	.....
Potassium ferrocyanide	———	———	———	———	.....
Potassium fluoride	———	———	———	———	.....
Potassium hydroxide	———	———	———	———	.....
Potassium hypochlorite	———	———	———	.....	
Potassium nitrate	———	———	———	———	.....
Potassium perborate	———	———	———	———	.....
Potassium perchlorate	———	———	———	———	.....
Potassium permanganate, 20%	———	———	———	———	.....
Potassium persulfate	———	———	———	———	.....
Potassium sulfate	———	———	———	———	.....
Potassium sulfide	———	———	———	———	.....
Propyl alcohol	———	———	———	———	.....
Propylene glycol	———	———	———	———	.....
Prussic acid	———	———	———	———	.....
Salicylic acid	———	———	———	———	.....
Sea water	———	———	———	———	———
Selenic acid	———	———	———	———	.....
Silicic acid	———	———	———	———	.....
Silicone oil	———	———	———	.....	.....
Silver acetate	———	———	———	———	.....
Silver cyanide	———	———	———	———	.....
Silver nitrate	———	———	———	———	.....
Soap solutions	———	———	———	———	.....
Sodium acetate	———	———	———	———	.....
Sodium benzoate	———	———	———	———	.....
Sodium bicarbonate	———	———	———	———	.....
Sodium bisulfate	———	———	———	———	.....
Sodium bisulfite	———	———	———	———	.....
Sodium borate	———	———	———	———	.....

——— Acceptable

..... Conditional depending on operating pressures

[redacted]

TABLE 24 continued

CHEMICAL	75 F	100 F	125 F	150 F	175°F
Sodium bromide	———	———	———	———	·····
Sodium carbonate	———	———	———	———	·····
Sodium chlorate	———	———	———	———	·····
Sodium chloride	———	———	———	———	·····
Sodium chlorite 50%	———	———	———	———	·····
Sodium cyanide	———	———	———	———	·····
Sodium ferricyanide	———	———	———	———	·····
Sodium ferrocyanide	———	———	———	———	·····
Sodium fluoride	———	———	———	———	·····
Sodium hydroxide	———	———	———	———	·····
Sodium hypochlorite	———	———	———	———	·····
Sodium nitrate	———	———	———	———	·····
Sodium nitrite	———	———	———	———	·····
Sodium sulfate	———	———	———	———	·····
Sodium sulfide	———	———	———	———	·····
Sodium thiosulfate	———	———	———	———	·····
Stannic chloride	———	———	———	———	·····
Stannous chloride	———	———	———	———	·····
Starch	———	———	———	———	·····
Stearic acid	———	———	———	———	·····
Sulfur dioxide	———	———	———	———	·····
Sulfuric acid 50%	———	———	———	———	·····
Sulfuric acid 70%	———	———	———	·····	
Sulfuric acid 80%	———	———	·····	·····	
Sulfuric acid 98%	·····	·····			
Sulfurous acid	———	———	———	———	·····
Tannic acid	———	———	———	———	·····
Tartaric acid	———	———	———	———	·····
Transformer oil	———	———	———	·····	
Trichloroacetic acid	———	———	———	·····	
Turpentine	———	·····	·····		
Urea	———	———	———	———	·····
Urine	———	———	———	———	
Vinegar	———	———	———	———	·····
Wines	———	———	———	———	·····
Yeast	———	———	———	———	·····
Zinc carbonate	———	———	———	———	·····
Zinc chloride	———	———	———	———	·····
Zinc oxide	———	———	———	———	·····
Zinc sulfate	———	———	———	———	·····

——— Acceptable

····· Conditional depending on operating pressures

TABLE 25
NON Conveyable Chemicals In Polyethylene Pipe

Aqua Regia
Bromine, gas
Bromine, liquid
Carbon disulfide
Carbon tetrachloride
Chlorine, gas
Chloroform
Fluorine
Nitric acid, above 70% conc.
Ozone
Sulfuric acid, fuming
Sulfur trioxide
Thyonil chloride
Toluene
Trichloroethylene
Xylene

product description CONTINUED

Reducer/Cleaner: XYLOL, R2 K 4

Shelf Life: 36 months (unopened)

Packaging (weight/gal.): 1 & 5 gal. containers; 12.5# ± .1 lbs./gal.

Shipping Weight: 1 gal.—13.3 ± .1 lbs.; 5 gal.—66.2 ± .1 lbs.

ANALYSIS:

Pigment by weight: 41.4%

Red Lead	19.4%
Natural Iron Oxide	6.9%
Calcium Carbonate	2.1%
Silicates	13.0%
Tinting Pigment Present	

Vehicle by weight: 58.6%

Chlorinated Rubber	11.7%
Aromatic Solvent	31.8%
Chlorinated Waxes	9.9%
Aliphatic Solvent	3.7%
Other	1.5%
TOTAL	100.0%

Limitations: HI-BILD Chlorinated Rubber Primer is not resistant to most solvents, animal and vegetable oil and fats common in dairies, packing houses and sewage treatment facilities.

PRECAUTIONS: FLAMMABLE, VAPOR HARMFUL, CONTAINS LEAD.

Surface Preparation and Priming: All surfaces must be dry and free of oil, grease, dirt, rust or other surface contamination.

Galvanized Iron and Aluminum: Not applicable—see Data Page E-14.

Masonry: Not applicable—see Data Page E-14.

Steel/Iron: Minimum surface preparation is Power Tool Cleaning per SSPC-SP 3-63. For severe exposure or immersion service, blast steel to White Metal Blast per SSPC-SP 5-63. Prime with HI-BILD Chlorinated Rubber Primer the same day and follow with the recommended number of topcoats.

Previously Painted Surfaces: (Not for Immersion) HI-BILD Chlorinated Rubber Primer is not recommended for application over other prime coats or enamels unless they are dried and hardened. If lifting occurs (test a small area), the old paint must be removed or apply a coat of KEM KROMIK® Metal Primer, B50 N 2 or B50 W 1 as a barrier coat.

Application: Apply HI-BILD Chlorinated Rubber Primer directly to all properly prepared iron and steel surfaces.

Mixing and Application: Mix paint thoroughly by boxing and stirring. May be applied by conventional or airless spray. Brush application should be limited to small areas. Be sure to coat thoroughly all welds, corners, etc. Apply at temperatures above 40°F. and relative humidity of less than 85%. Substrate temperatures must be 5°F. above dew point.

Equipment

Brush (small areas only):
Reduce with up to 1 pint XYLOL per gallon if necessary.

Conventional Spray:

Air Supply	80 psi at nozzle, fluid pressure 15 psi
Gun	DeVilbiss JGA 502
Cap	704 Cap, E Tip
Reduction	Up to 1 pt./gal. XYLOL, R2 K 4

Airless Spray:

Pump (Minimum)	SHERWIN-WILLIAMS Super Stinger®
Fluid Pressure	2000 psi
Strainer	60 mesh
Tip	.015
Reduction	If necessary up to 1 pt./gal XYLOL, R2 K 4

Cleanup Information: Clean equipment with XYLOL, R2 K 4 following suppliers safety recommendations.

HI-MIL SHER-TAR™ EPOXY ENAMEL
Part A, B69 B 40
Part B, B60 V 40

PRODUCT DESCRIPTION
A one coat, high build polyamide cured coal tar epoxy enamel.

Uses:
- Heavy duty structural protection.
- Nonpotable water tank and pipe coating
- Liner for sewage treatment tanks and equipment
- Use one coat where 2 coats of standard coal tar are normally specified
- Concrete and steel structures. No primer or topcoat required
- Protection against splash and spillage of a wide variety of chemicals
- Hi-Mil Sher-Tar is recommended for:

penstocks	dam gates
sewage treatment equipment	underground tanks
	plating operations
offshore rigs	paper mills
canal linings	salt and fresh water
chemical plants	crude oil storage
tidal and splash zones	

Performance Information:

Physical Properties:
- Abrasion resistance ..... 483 mg. (ASTM D4060, CS17 Wheel, 1000 cycles, 1 kg. Taber Abraser)
- Flexibility ..... passes (ASTM D1737, 180° bend, ¼" mandrel)
- Pencil Hardness ..... >8H (ASTM D3363)
- Elcometer adhesion ..... >350 psi
- Dry Heat Resistance ..... 325°F. (ASTM D2485)
- Wet Heat Resistance ..... 140°F.
- Direct impact ..... >80 in. lbs. (ASTM G14)
- Moisture condensation resistance, 100°F., 1000 hours ..... No failure (ASTM D1735)
- Salt Fog resistance, 1000 hours ..... Excellent (ASTM B117)
- Thermal shock, 250 cycles ..... Excellent (ASTM D1211)
- Meets performance requirements of DOD-P-23236A, (Replaces MIL-P-23236) Type 1, Class 2

Chemical Resistance Guide (ANSI N5.12): Consult your Sherwin-Williams representative for specific application and performance recommendations.

Immersion Resistance:
- Aliphatic hydrocarbon solvents, gasoline, kerosene, fuel oil, sour crude oil
- Lubricating oils, cutting oil, animal and vegetable oils and fats
- Alkalies
- Fresh water and sea water

Resistance to Fumes, Splash and Spillage:
- Weak solutions of mineral and organic acids: SEVERE
- Aromatic hydrocarbon solvents: MODERATE
- Glycol ethers, alcohols, selected hydrocarbon solvents, formaldehyde: SEVERE

CHARACTERISTICS
Finish: Semi-Gloss

Color: Black

Spreading Rate: 55 sq. ft. per gal. (theoretical—no loss*): @ 28 mils wet

*Allow for application losses and surface irregularities when determining working requirements.

Recommended: 28 mils wet/coat

Film Thickness (spray): 20 mils dry/coat

Spreading Rate Coverage @ 1.0 mil dry (theoretical, calculated): 1140 sq. ft. per gal.

Volume Solids: 71% ± 2%

Weight Solids: 80% ± 2°

Application Conditions: Temperature (air surface, material): 55°F. minimum, 100°F. maximum.

Relative Humidity: 90% maximum

Substrate Temperature: 5°F. above dew point

Drying Schedule (temperature dependent) @ 77° & 50% RH @ 28 mils wet: To Touch: 8–10 hours. To Handle: 48 hours. To Recoat: 18 hours min.

Requires minimum 7–10 days cure before placing in service.

Pot Life: @ 70°F.: 4 hours., @ 100°F.: 1 hour

Curing Mechanism: Crosslink polymerization

Flash Point (catalyzed), Pensky-Martens closed cup): 110°F.

Reducer/Cleaner: Reducer #54, R7 K 54

Shelf Life: Minimum 12 months (unopened)

Packaging:
Part A: 3 gal. per 5 gal. pail
Part B: 1 gal. can.

Weight/Gal. (catalyzed): 10.4 ± .1 lbs./gal.

Shipping Weight: 46.5 lbs./4 gal.

Application: Conventional and airless spray

ANALYSIS (MIXED):

Pigment by weight: 24%

Silicates	21%
Silica	3%

Vehicle by weight: 76%

Polyamide Resin	11%
Epoxy Resin	14%
Coal Tar	27%
Lecithin	2%
Aromatic Hydrocarbon	19%
Alcohols	3%
Totals	100%

PRECAUTIONS: B69B40, COMBUSTIBLE
B60V40, COMBUSTIBLE—VAPOR HARMFUL

APPLICATION GUIDE

CHEMICAL	CPVC	PVC	EPOXY	POLYPRO	NORYL (PPO)	LUCITE	KYNAR	TEFLON	SS 316	CARP 20	HAST. C	TITANIUM	CERAMIC	NEOPRENE	BUNA N	HYPALON	VITON	DYHEL	COTTON	ORLON	NYLON
FERRIC NITRATE	A	A	A	A	A	A	A	A	B	A	B	A	A	A	B	B	B	A	D	A	E
FERRIC SULFATE	A	A	A	A	A	A	A	A	E	E	B	A	A	A	B	B	B	A	E	A	E
FERROUS CHLORIDE	A	A	A	A	A	A	A	A	D	A	B	A	A	A	X	X	X	D	E	A	E
FERROUS SULFATE	A	A	A	A	A	A	A	A	B	A	A	A	A	A	B	B	B	A	E	A	E
FLUOBORIC ACID	A	A	X	A	A	A	A	A	B	A	A	A	A	A	E	E	E	A	E	A	E
FLUOSILICIC ACID	A	A	D	A	A	A	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
FORMALDEHYDE, 40%	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FORMIC ACID	A	A	C	A	A	B	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
FREON 12 (WET)	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FUEL OILS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FURFURAL	A	A	X	A	A	E	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
GASOLINE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
GLYCERINE (GLYCEROL)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HEPTANE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HEXANE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HYDROBROMIC ACID, 20%	C	C	X	B	B	B	A	A	E	B-C	B-C	A	C	C	E	E	E	A	E	A	E
HYDROCHLORIC ACID, 0-25%	A	A	B	A	A	A	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
HYDROCHLORIC ACID, 25-37%	A	A	C	A	A	A	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
HYDROCYANIC ACID	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HYDROFLUORIC ACID, 10%	C	C	X	B	B	B	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
HYDROFLUORIC ACID, 30%	D	D	X	C	C	C	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
HYDROFLUORIC ACID, 60%	A	A	X	A	A	A	A	A	E	A	A	A	A	A	E	E	E	A	E	A	E
HYDROFLUOSILICIC ACID, 20%	C	C	X	B	B	B	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
HYDROGEN PEROXIDE, 30%	A	A	D	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
HYDROGEN PEROXIDE, 50%	A	A	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
HYDROGEN PEROXIDE, 90%	A	A	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
HYDROGEN SULFIDE, AQ.SOL.	C	C	X	B	B	B	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
IODINE (IN ALCOHOL)	C	C	X	B	B	B	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
KEROSENE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
KETONES	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
LACQUER THINNERS	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
LACTIC ACID	D	D	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
LEAD ACETATE	B	B	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
LUBRICATING OIL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
MAGNESIUM CHLORIDE	C	C	X	B	B	B	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E
MAGNESIUM NITRATE	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
MAGNESIUM SULFATE	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
MALEIC ACID	A	A	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
METHYL ALCOHOL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
METHYL CHLORIDE	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
METHYL ETHYL KETONE	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
METHYL ISOBUTYL KETONE	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
METHYLENE CHLORIDE	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
NAPTHA	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
NAPTHALENE	E	E	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
NICKEL CHLORIDE	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NICKEL SULFATE	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NITRIC ACID, 10%	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NITRIC ACID, 20%	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NITRIC ACID, 50%	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NITRIC ACID, ANHYDROUS	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
NITRO BENZENE	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
OILS AND FATS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
OLEIX ACID	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
OLEUM, 25%	E	E	X	E	E	E	A	A	E	A	A	A	E	E	E	E	E	A	E	A	E
OXALIC ACID	D	D	X	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
PHENOL	C	C	A	C	C	C	A	A	E	B	B	A	C	C	E	E	E	A	E	A	E

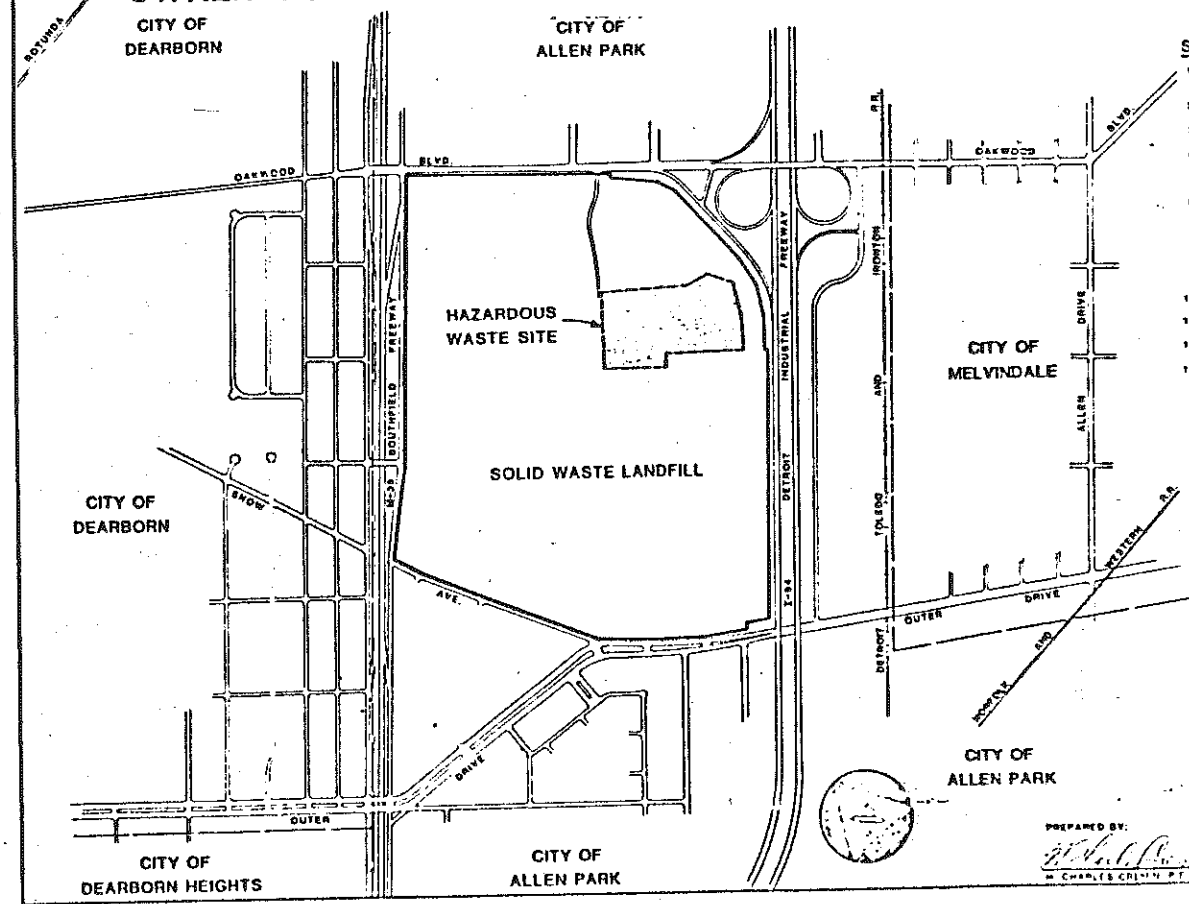
SYMBOL IDENTIFICATION

A – Excellent
B – Good
C – Good to 80°F
D – Moderate effect (use under limited conditions)
E – Not recommended
F – Autocatalytic
X – Unknown

ALLEN PARK CLAY MINE LANDFILL

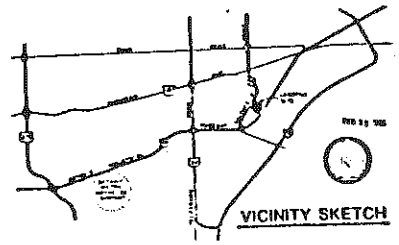
HAZARDOUS WASTE DISPOSAL SITE

OWNER: FORD MOTOR COMPANY LOCATION: CITY OF ALLEN PARK, WAYNE CO., MICH.



SHEET INDEX:

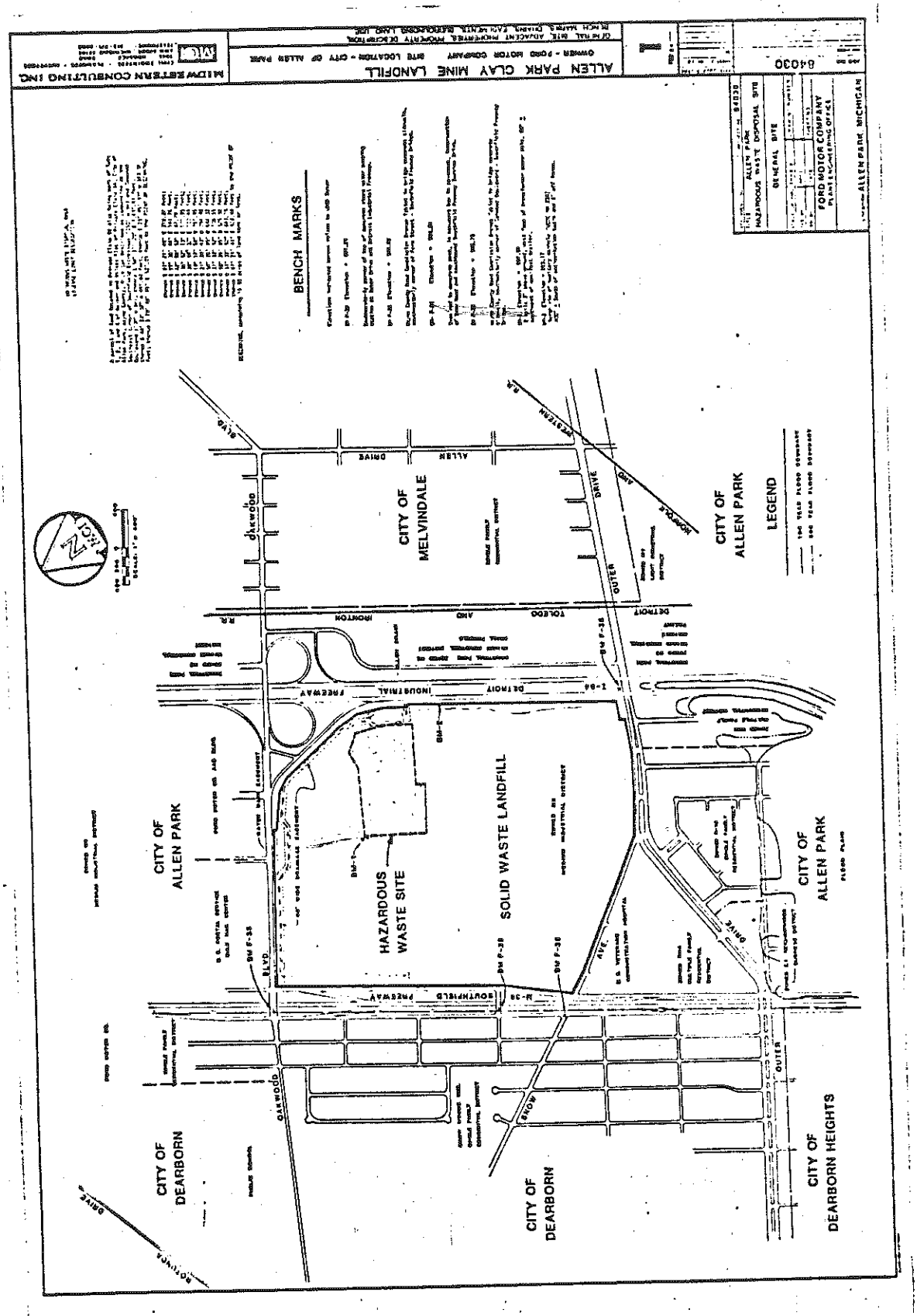
1. GENERAL SITE, ADJACENT PROPERTIES, PROPERTY DESCRIPTION, BENCH MARKS, DRAINS, EASEMENTS, SURROUNDING LAND USE
2. 200 SCALE AERIAL PHOTO
3. MASTER PLAN - CELL SITES, GRADING PLAN, MAJOR ROADS, DRAINS
4. 200 SCALE EXISTING TOPOGRAPHY - NORTH HALF
5. 200 SCALE EXISTING TOPOGRAPHY - SOUTH HALF
6. 40 SCALE PROPOSED HAZARDOUS WASTE PLAN (FINAL PLANS - CELL II
7. 40 SCALE FINAL PLAN SECTIONS - CELL II
8. PROPOSED HAZARDOUS WASTE PHASING PLANS AND SECTIONS - CELL II
9. SECTIONS AND DETAILS
10. SECURITY, TRAFFIC, WIND ROSE, STRUCTURES, UTILITIES
11. LEACHATE COLLECTION DETAILS
12. FLOOD MAP
13. CONSTRUCTION REQUIREMENTS & QUALITY ASSURANCE

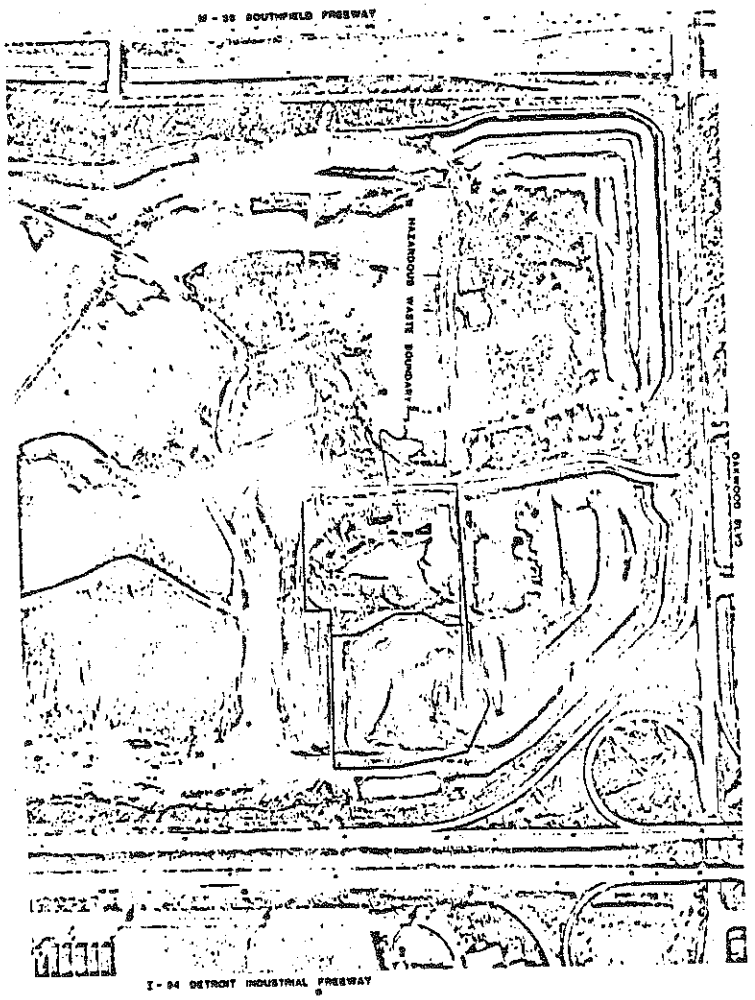


VICINITY SKETCH

PREPARED BY:

PREPARED BY
MIDWESTERN CONSULTING INC.


ALLEN PARK CLAY MINE LANDFILL
FORD MOTOR COMPANY
BENCH MARKS
LEGEND
CITY OF MELVINDALE
CITY OF ALLEN PARK
CITY OF DEARBORN
CITY OF DEARBORN HEIGHTS
HAZARDOUS WASTE SITE
SOLID WASTE LANDFILL
SOUTHFIELD FREEWAY
I-94 DETROIT INDUSTRIAL FREEWAY
OUTER DRIVE
DEARBORN
ALLEN PARK, MICHIGAN



ALLEN PARK, MICHIGAN

FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE

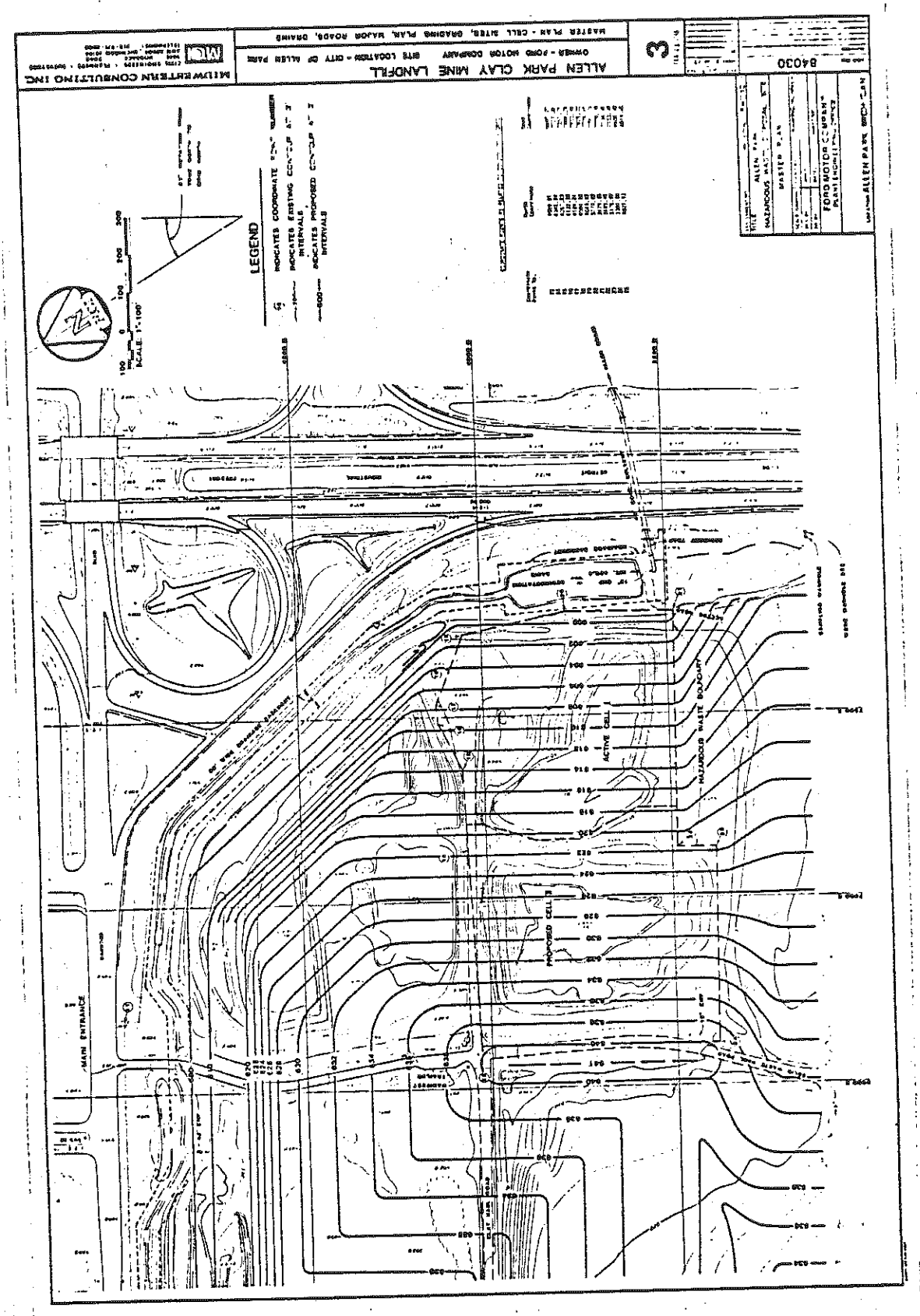
HAZARDOUS WASTE DISPOSAL SITE
200 SCALE AERIAL PHOTO

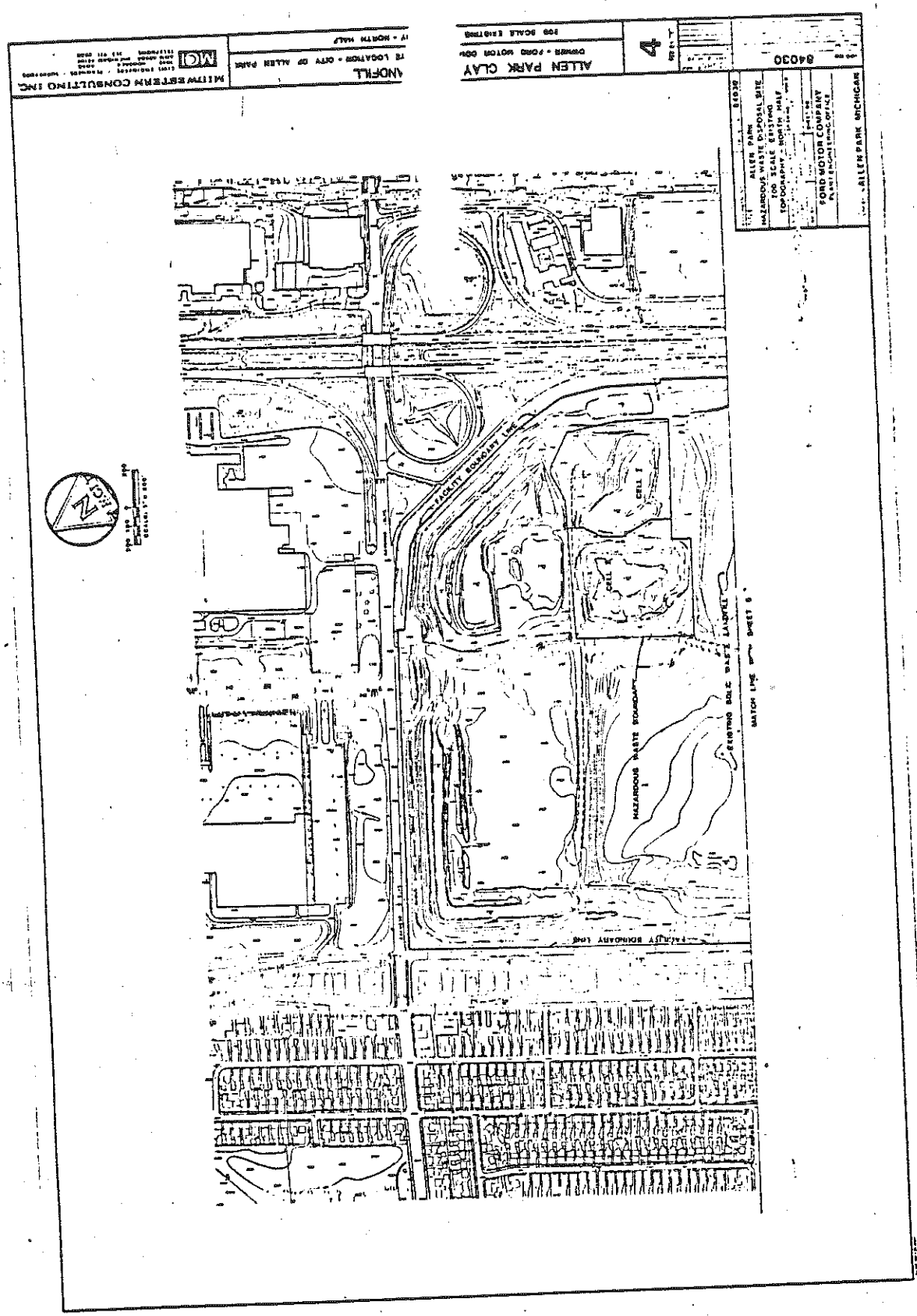
84030

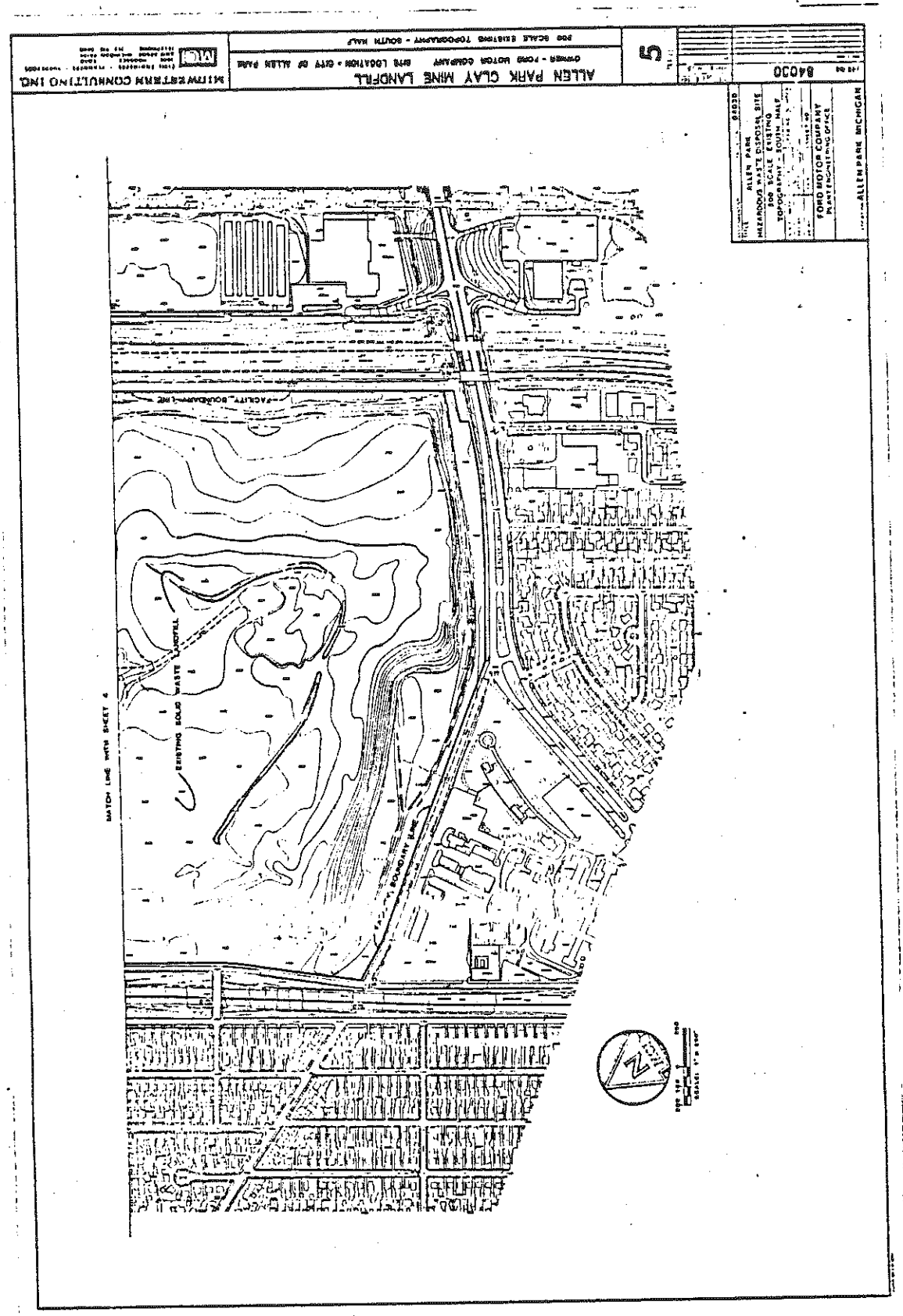
2

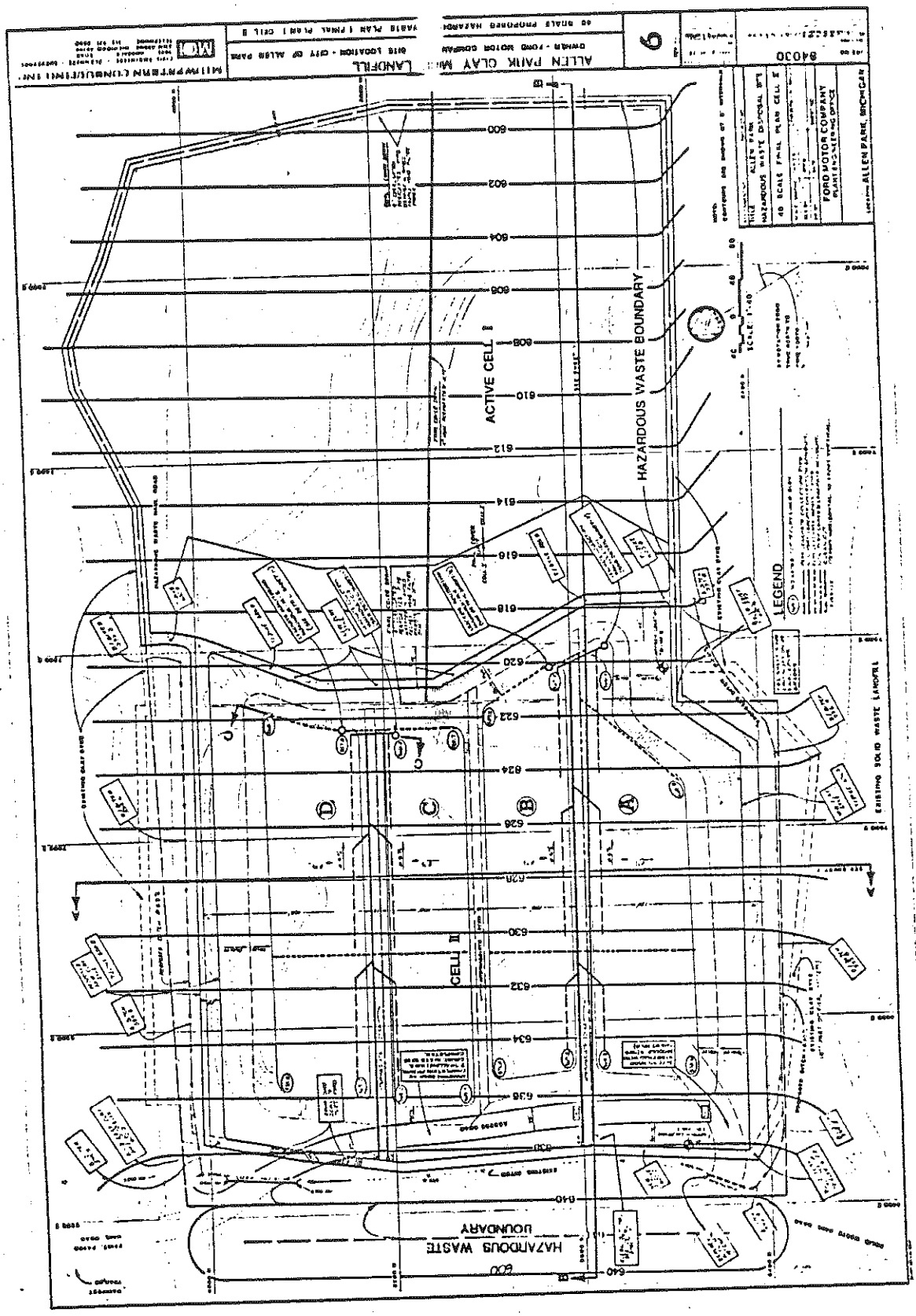
ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
200 SCALE AERIAL PHOTO

MIDWESTERN CONSULTING INC.
MCI

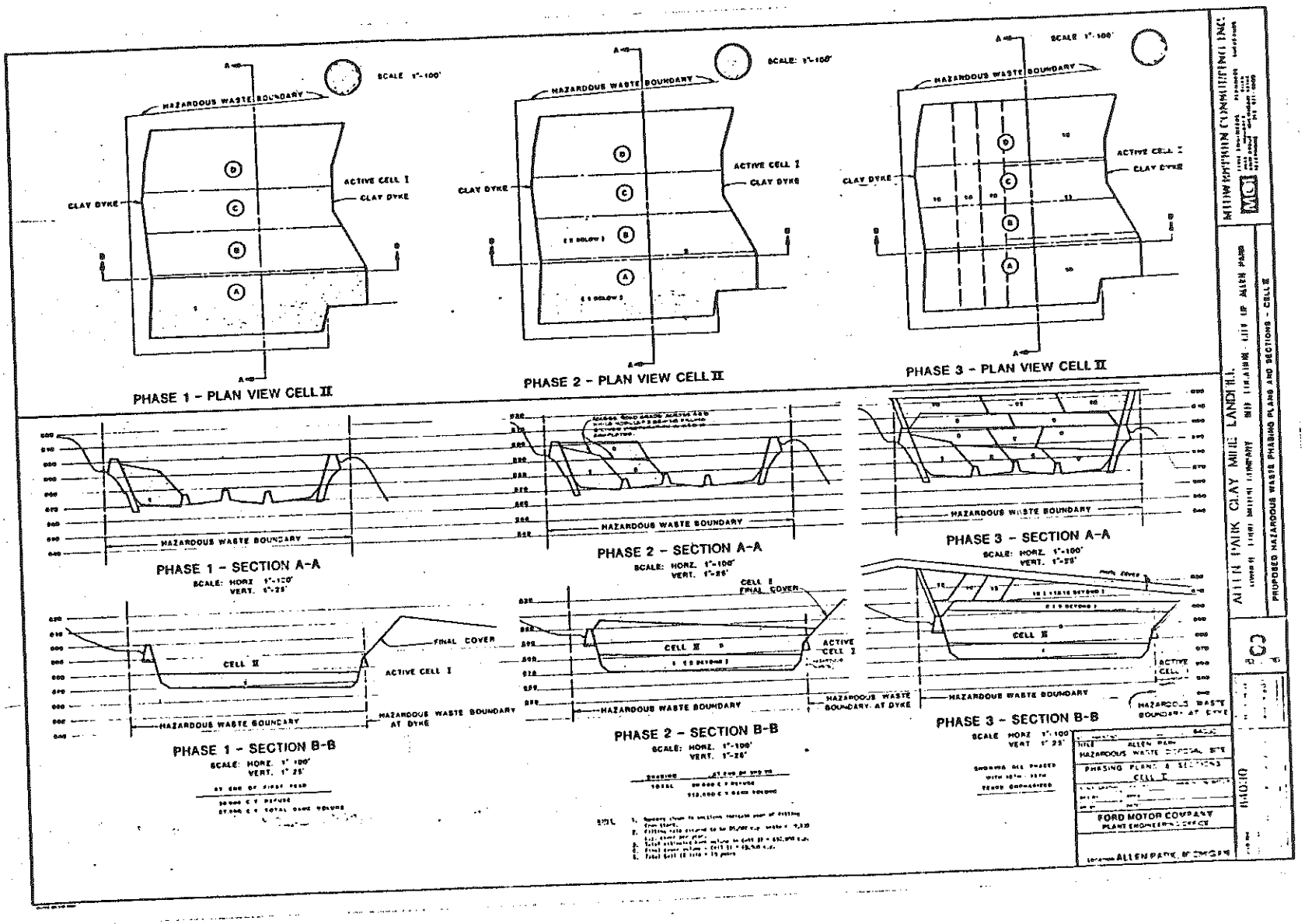

ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
MASTER PLAN - CELL SITES, GRADING PLAN, HAUL ROADS, DRAINS
MILLWESTERN CONSULTING INC
B4030
ALLEN PARK BRICK CAN
FORD MOTOR COMPANY
HAZARDOUS WASTE DISPOSAL SITE
MASTER PLAN
LEGEND
INDICATES COORDINATE GRID NUMBER
INDICATES EXISTING CONTOUR AT 2' INTERVALS
INDICATES PROPOSED CONTOUR AT 2' INTERVALS
SCALE 1" = 100'
MAIN ENTRANCE
PROPOSED CELL
ACTIVE CELL
HAZARDOUS WASTE BOUNDARY

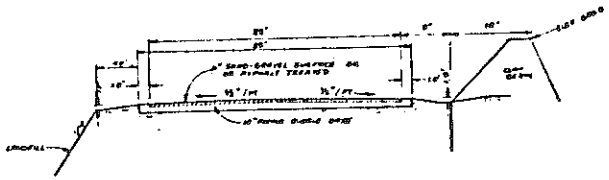

ALLEN PARK CLAY
FACILITY BOUNDARY LINE
CELL I
CELL II
HAZARDOUS WASTE BOUNDARY
EXISTING SOLID WASTE LANDFILL
FACILITY BOUNDARY LINE
MATCH LINE SHEET 5
FORD MOTOR COMPANY
ALLEN PARK MICHIGAN
MILLIWESTERN CONSULTING INC.


ALLEN PARK CLAY MINE LANDFILL
EXISTING SOLID WASTE LANDFILL
PROPERTY BOUNDARY LINE
MATCH LINE WITH SHEET 4
ALLEN PARK MICHIGAN
FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE
ALLEN PARK DISPOSAL SITE
HAZARDOUS WASTE EXISTING
FOR SCALE EXISTING
TOPOGRAPHY — SOUTH HALF
84030
5
MILLER-STEARN CONSULTING INC.

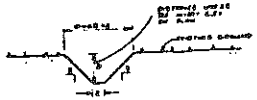

ALLEN PARK CLAY MINE
LANDFILL
84030
FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE
ALLEN PARK, MICHIGAN
HAZARDOUS WASTE DISPOSAL SITE
40 SCALE FINAL PLAN CELL II
ACTIVE CELL II
HAZARDOUS WASTE BOUNDARY
LEGEND
EXISTING SOLID WASTE LANDFILL
CELL II
HAZARDOUS WASTE BOUNDARY
600
602
604
606
608
610
612
614
616
618
620
622
624
626
628
630
632
634
636
638
640

ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
40 SCALE FINAL PLAN SECTIONS - CELL II
MILLIKEN-THEIN CONSULTING INC.
7
B4030
ALLEN PARK, MICHIGAN
FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE
HAZARDOUS WASTE DISPOSAL SITE
40 SCALE
FINAL PLAN SECTIONS CELL II
SECTION A-A
SECTION B-B
CELL II
ACTIVE CELL I
EXISTING SOLID WASTE LANDFILL
PROPOSED HAZARDOUS WASTE CELL II
Ⓐ
Ⓑ
Ⓒ
Ⓓ

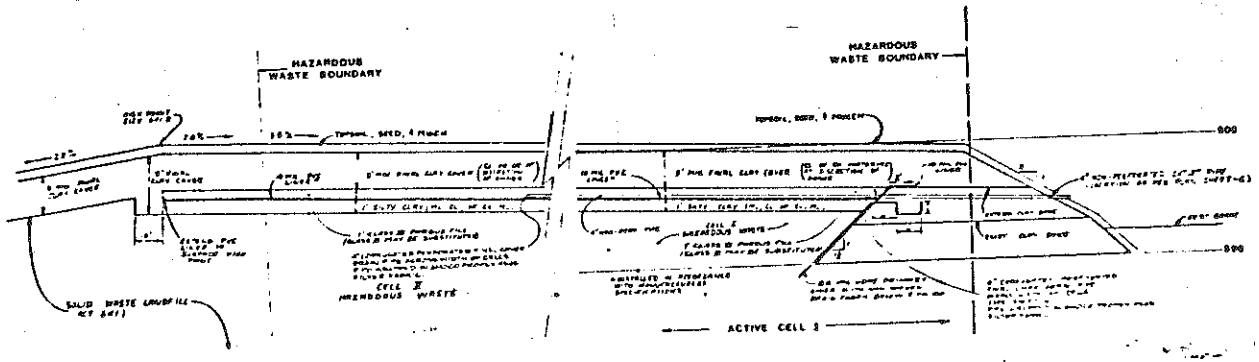

PHASE 1 - PLAN VIEW CELL II
PHASE 2 - PLAN VIEW CELL II
PHASE 3 - PLAN VIEW CELL II
HAZARDOUS WASTE BOUNDARY
CLAY DYKE
ACTIVE CELL I
SCALE 1"=100'
PHASE 1 - SECTION A-A
SCALE: HORZ 1"=100' VERT. 1"=25'
PHASE 2 - SECTION A-A
SCALE: HORZ. 1"=100' VERT. 1"=25'
PHASE 3 - SECTION A-A
SCALE: HORZ. 1"=100' VERT. 1"=25'
PHASE 1 - SECTION B-B
SCALE: HORZ. 1"=100' VERT. 1"=25'
PHASE 2 - SECTION B-B
SCALE: HORZ. 1"=100' VERT. 1"=25'
PHASE 3 - SECTION B-B
SCALE HORZ 1"=100' VERT 1"=25'
CELL II
FINAL COVER
HAZARDOUS WASTE BOUNDARY AT DYKE
ALLEN PARK CLAY MINE LANDFILL
PROPOSED HAZARDOUS WASTE PHASING PLANS AND SECTIONS - CELL II
FORD MOTOR COMPANY
PHASING PLANS & SECTIONS CELL II



TYPICAL ACCESS ROAD SECTION



TYPICAL PERIMETER DITCH SECTION



(WEST END OF SECTION B - B SHEET - 11)

FINAL COVER DETAIL

(EAST END OF SECTION B - B SHEET - 11)

SCALE: VERT. 1" = 0'
HORZ. NO SCALE

MIDWESTERN CONSULTING INC.

ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
SECTIONS AND DETAILS

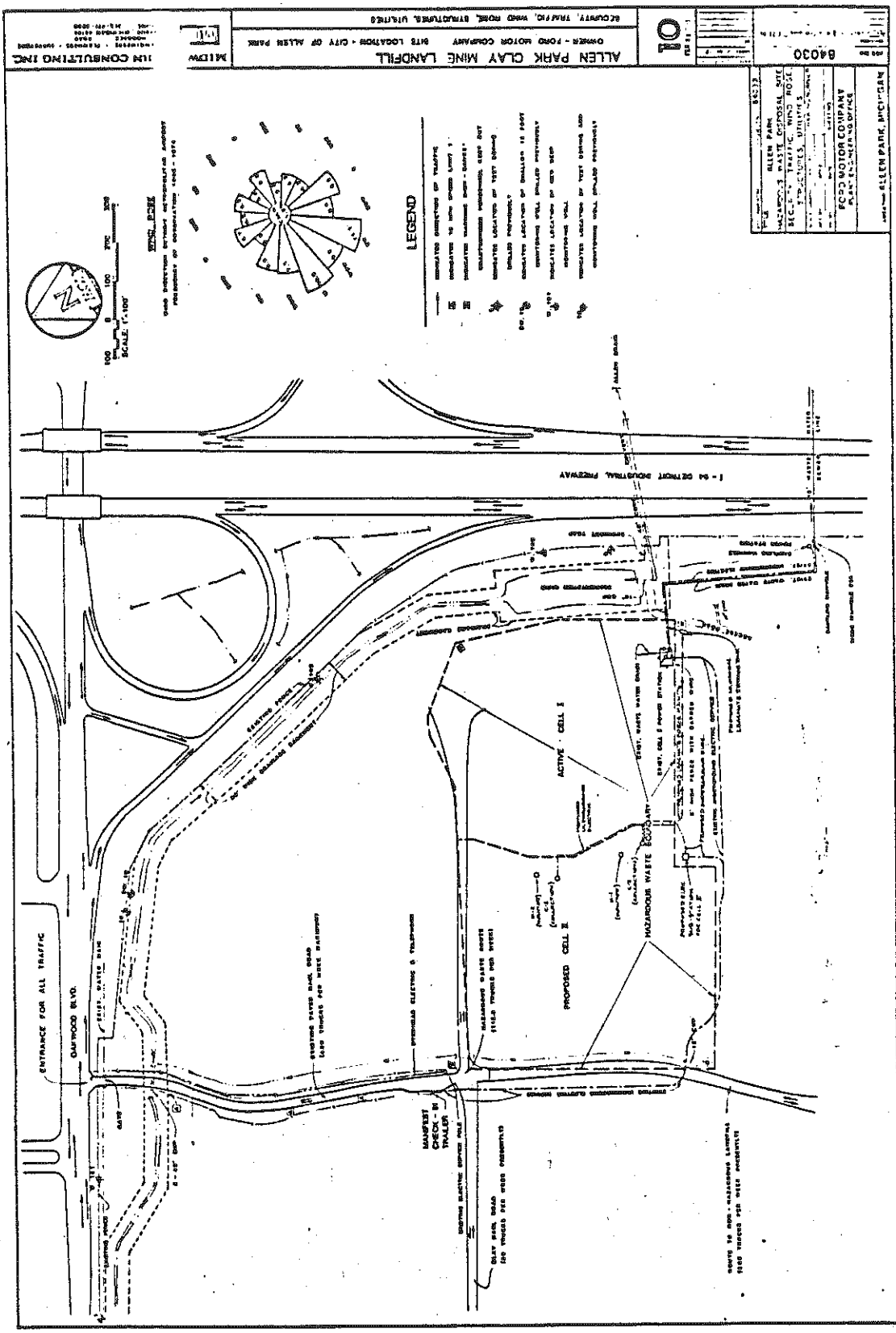
9

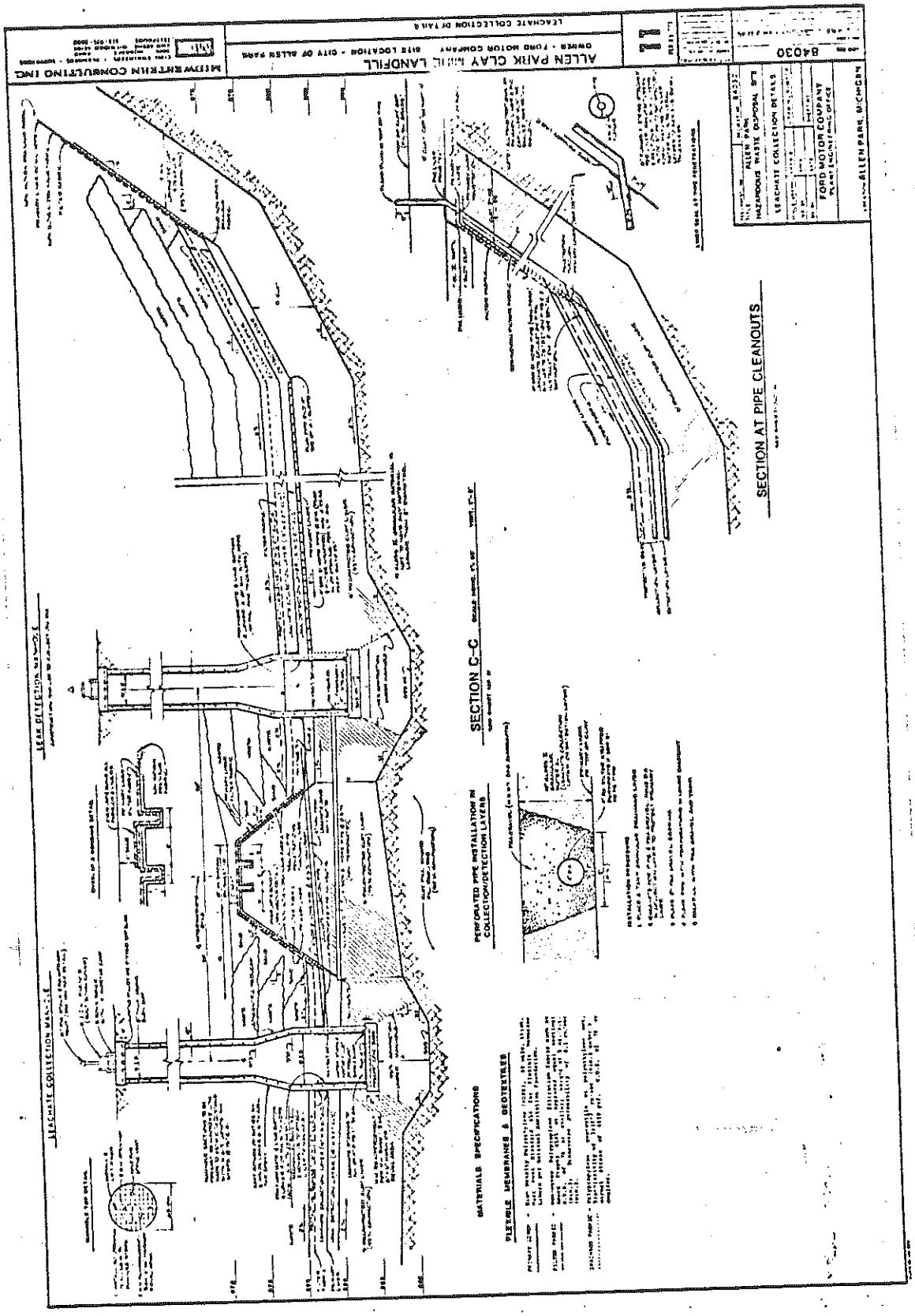
SITE ALLEN PARK
HAZARDOUS WASTE DISPOSAL SITE
SECTIONS AND DETAILS

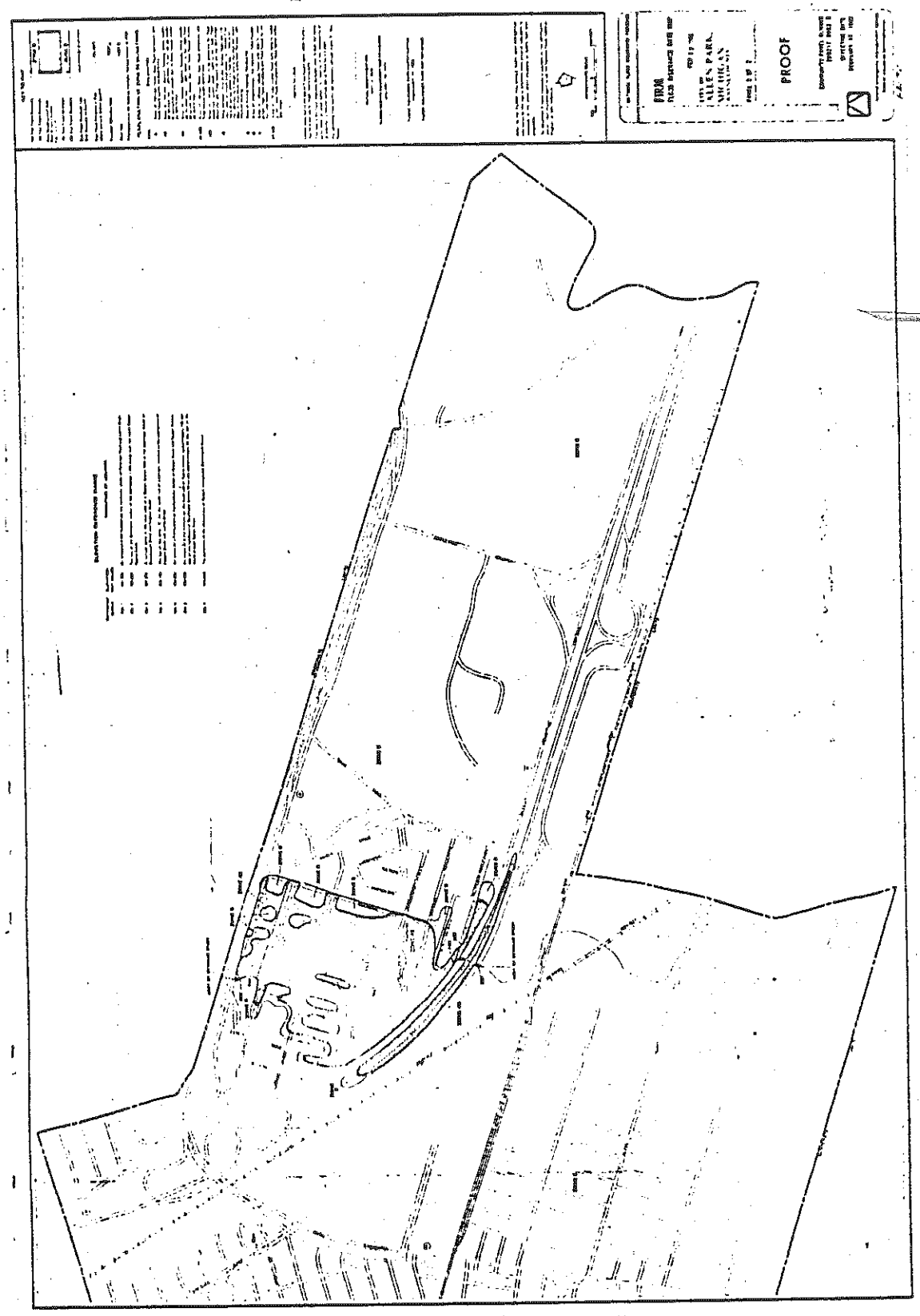
FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE
ALLEN PARK, MICHIGAN

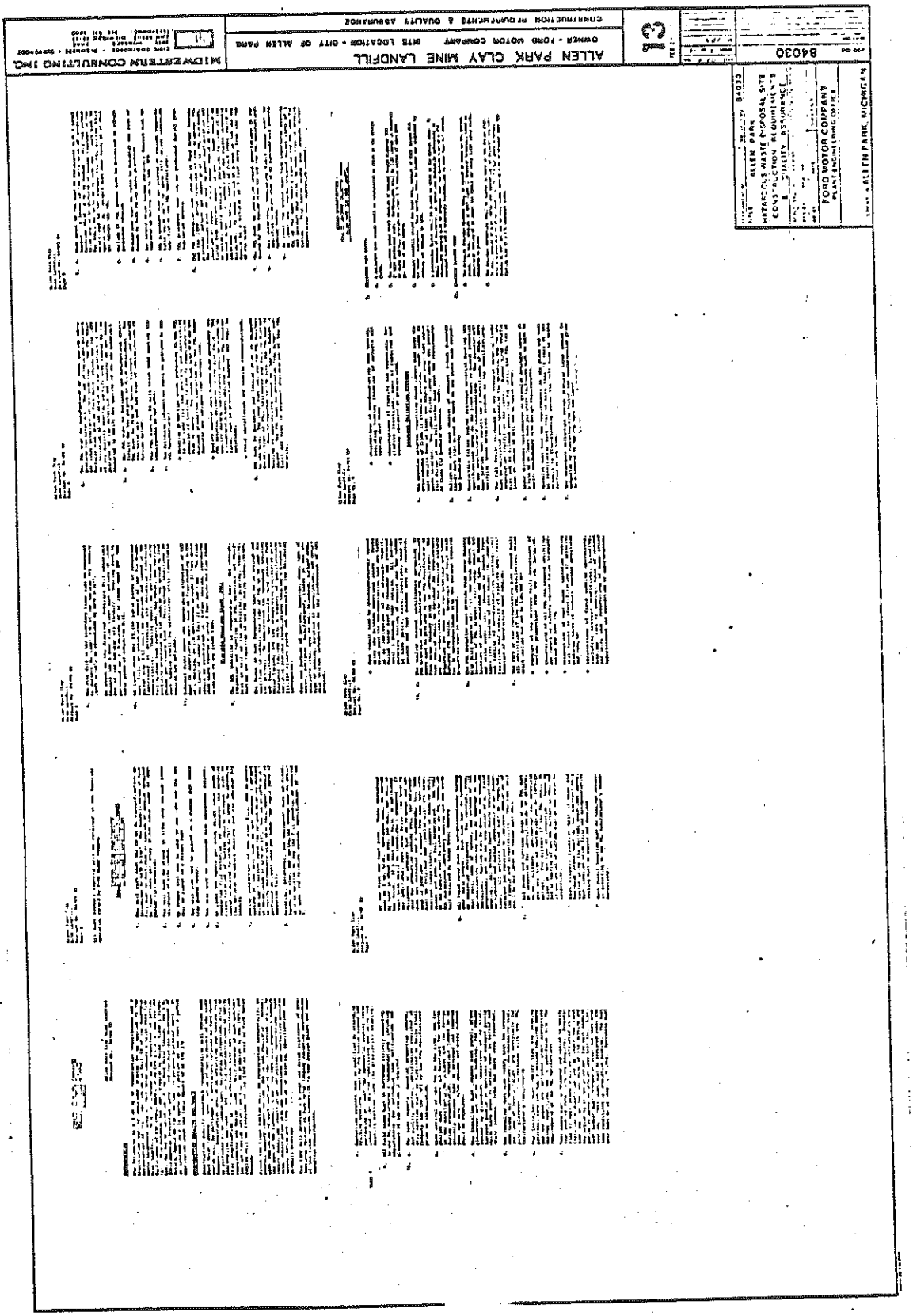
84030

84030


ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
SCOUNTY, TWP/PO, WARD ROAD, STRUCTURES, UTILITIES
ALLEN PARK
LEGEND
SCALE: 1"=100'
ENTRANCE FOR ALL TRAFFIC
OAKWOOD BLVD.
I - 94 DETROIT INDUSTRIAL FREEWAY
ACTIVE - CELL I
PROPOSED CELL II
HAZARDOUS WASTE BOUNDARY
MANIFEST CHECK - IN TRAILER
ALLEN PARK, MICHIGAN


ALLEN PARK CLAY MINE LANDFILL
OWNER - FORD MOTOR COMPANY SITE LOCATION - CITY OF ALLEN PARK
LEACHATE COLLECTION DETAILS
MCKIM BERTRAM CONSULTING INC
B4030
HAZARDOUS WASTE DISPOSAL SITE
LEACHATE COLLECTION DETAILS
FORD MOTOR COMPANY
PLANT ENGINEERING OFFICE
ALLEN PARK, MICHIGAN
SECTION AT PIPE CLEANOUTS
SECTION C-C
LEACHATE COLLECTION MANHOLE
LEAK DETECTION MANHOLE
PERFORATED PIPE INSTALLATION IN COLLECTION/DETECTION LAYERS
MATERIALS SPECIFICATIONS
FLEXIBLE MEMBRANES & GEOTEXTILES


FIRM
PROOF



6. Storm Water - Insure that storm water collected in the inactive areas does not come in contact with active work areas. Inspect integrity of diversion berms in the cell in order to maintain separation of active from inactive work areas. Inspect run-on and run-off diversion berms and dikes for erosion or general damage that would allow water into the waste management area.

7. Leachate System - Inspect record and sample the following system components.

a) Primary and Secondary Pump Systems.

1. Switching mechanisms operable.
2. Pumps operable.
3. Verify liquid volumes in sump.

b) Primary Leachate Holding Tanks.

1. Monitor secondary containment.
2. Monitor leachate volume.
3. Sample leachate (if necessary).

c) Secondary Holding Tanks

1. Monitor liquid volume.
2. Sample and analyse liquid (if necessary).

d) Discharge Lines.

1. Inspect for damage (clean-outs)

e) Sampling Manhole.

1. Proper flow recording.
2. Proper leachate discharge.

8. Bulldozer - Insure bulldozer is operable.

9. Telephone - Insure operation of phone.

Weekly Items

1. Fire extinguishers - Check the availability and pressure gauges on the fire extinguishers. Extinguishers are in Manifest Trailer and mobile operating equipment.
2. Gauze Masks - Verify that the gauze masks are available.
3. Perimeter Fence - Look for locations where the fence is in disrepair.
4. Surface Drains - Look for blocked drainage and surface water contamination.
5. Sediment Basin - Check the outflow for blocked drainage and surface water contamination.
6. Intermediate cover - Inspect all fill areas that do not have final cover to insure that intermediate cover is adequate. Inspect for erosion or other damage that could or has exposed wastes.

Quarterly Items

1. Monitor Wells - Inspect integrity of protective casings, including caps and locks.
2. Final cover - Inspect all areas which have received final cover for deep rooted vegetation, deterioration of vegetative cover, areas of surface erosion and other surface disturbances.
3. Fire Hydrant - Inspect for vandalism.

G-4n Landfill Leakage 40 CFR 264.52

Due to artesian conditions at the site (refer to Attachment 15), groundwater is expected to flow into the secondary collection system at the rate of 50-100 gallons per day. Should the primary liner fail, the secondary collection system combined with the site hydrogeological characteristics will prevent migration of the leachate into the underlying aquifer. Under such conditions, there is no need to notify the administrator, take remedial action, nor enact a groundwater detection program.

G-5 Emergency Equipment and Power Sources 40 CFR 264.52(e)

Fire Extinguishers	- 1 for gas, oils, solvents, located at office trailer.
	- 1 for liquids, electrical, combustibles, located at office trailer.
	- 1 for liquids, electrical, combustibles, located at bulldozer.
Caterpillar D-7	- Wide-track bulldozer for spill containment, etc.
Telephone	- Located at office trailer.
Fire Hydrant	- Located north of entrance gate.
Misc. Mobil Equipment	- Available at the Ford Rouge Plant upon request (front endloaders, vacuum truck, etc.).

I-2 Post-Closure Plan 40 CFR 270.14(b)(13)

Ford Allen Park Clay Mine

Landfill Post-Closure Plan

March 1, 1985

Site Name: Ford Motor Company Allen Park Clay Mine

Site I.D. #: MID 980568711

Owner's Name: Ford Motor Company

Site Address: 17250 Oakwood Blvd., Allen Park, Michigan 48101

Telephone: (313) 336-5725

Contact: J. S. Amber
15201 Centry Drive
Dearborn, Michigan 48120
(313) 322-4646

I-2a Facility Inspection Plan 40 CFR 270.17(g)

Inspection logs are to be kept that indicate, frequency and inspection procedures, which are explained below.

1. Security Control: Fencing, gates, locks, and warning signs are to be inspected for vandalism and disrepair on a weekly basis.
2. Leachate Collection Systems: The pumps, switch mechanisms, discharge lines, holding tanks and power supply are to be inspected on a weekly basis until leachate is no longer detected. At such time inspections are to be made monthly until leachate is no longer generated. The inspection shall include:

I-2a Facility Inspection Plan 40 CFR 270.17(g) (cont'd)

- obstructions, or damage to the discharge pipes in the cover drainage layer.
- burrowing by animals.
- surface disturbance due to excavation or unwarranted vehicle traffic.

Such inspections should be performed quarterly, because erosion damage and prlblems with cover require several months to develop.

4. Well Condition: Inspection of the monitor wells should include noted evidence of vandalism or disrepair such as broken caps, corrosion of casing, displacement of annular seal, etc. on a quarterly basis consistent with present active operating procedure.

I-2a Facility Inspection Plan 40 CFR 270.17(g) (cont'd)

2. Leachate Collection Systems: (cont'd)

a) Primary and Secondary Pump Systems.

1. Switching mechanisms operable.

2. Pumps operable.

3. Verify liquid volumes in sump.

b) Primary Leachate Holding Tanks.

1. Monitor liquid volume.

2. Sample and analyze liquid (if necessary).

c) Secondary Holding Tanks.

1. Monitor liquid volume.

2. Sample and analyze liquid (if necessary).

d) Discharge Lines.

1. Inspect for damage (clean-outs).

e) Sampling Manhole.

1. Proper flow recording.

2. Proper leachate discharge.

3. Damage to Cover and Drainage:

Inspections will be directed toward the identification of:

- invasion of undesirable plant species (deep rooted plants such as woody plants).
- deterioration of vegetative cover.
- disruption of drainage grades due to settlement.
- soft, wet, or unstable areas of the cover.
- areas of surface erosion.

Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

RECEIVED
NOV 9 1984
WASTE MANAGEMENT BRANCH

November 9, 1984

RECEIVED
NOV 14 1984
WMD-RAIU
EPA, REGION V

Attention: 5HW-13
U. S. Environmental
Protection Agency
Region V
230 South Dearborn Street
Chicago, IL 60604

Subject: Notice of Deficiency - RCRA Part B Application
Ford Allen Park Clay Mine
E.P.A. I.D. No. MID [redacted]

Attention: 5HW-13:

Enclosed are four copies of amended or supplemental information to be inserted into our original RCRA Part B Application, as filed with EPA for the subject facility. Per your request, the following directions explain which original pages are to be removed or replaced and which amended or supplemental pages are to be included into the application. A copy of the deficiency letter is provided for reference.

270.14(b)(3)

Replace pages 93-98 with pages 93A-98A. Note that sampling methods have been specified from 40 CFR Part 261, Appendix I.

270.14(b)(5)

Replace pages 273 through 275 and page 285 with pages 273A through 275A and page 285A.

270.14(b)(10)

Replace pages 62 and 63 with pages 62A and 63A. Insert pages 70.01A through 70.11A between pages 70 and 71.

270.14(c)(2)

Replace page 211 with page 211A and insert page 267.1A.

COPY

270.21(b)(1)

A liner engineering report utilizing a synthetic membrane has been initiated and will be completed as soon as possible. Per discussions with Mr. Joe Boyle of EPA Region V staff, I understand the due date for submittal of this report will be extended until January 31, 1985, because of the additional field work required. Compatibility test work will commence as soon as the liner engineering report permits, with the resulting data and liner selection to be made available to your office immediately thereafter.

270.21(b)(5)

Insert pages 162.1A and 162.2A after page 162.

Yours very truly,

Ben C. Trethewey, Manager
Mining Properties Department

Attachment

cc: Mr. Alan J. Howard, MDNR

NOTICE of DEFICIENCY

FORD MOTOR COMPANY ALLEN PARK CLAY MINE
MID 980568711

270.14(b)(3) The waste analysis plan does not specify sampling methods taken from 40 CFR Part 261, Appendix I.

270.14(b)(5) The inspection schedule does not address inspection of emergency equipment which is identified in the contingency plan.

270.14(b)(10) The application does not describe load bearing capacity and surfacing of all access roads to the point of disposal.

270.14(c)(2) Exhibit H of the application indicates the presence of a water table within the shallow sand layer near the surface at wells W-102 and W-103. However, the application does not provide identification of this uppermost aquifer, including groundwater flow direction and rate, and the basis for such an identification.

270.14(c)(3) The application does not describe a proposed point of compliance or the information required by (c)(2) in the manner required.

270.14(c)(4) The application does not address whether any plume of contamination has entered the groundwater from a regulated unit. Note that "ground water" means water below the land surface in a zone of saturation (260.10).

270.14(c)(5) The application does not contain detailed plans and an engineering report, certified by a registered professional engineer describing a proposed ground water monitoring system to be implemented to meet the requirements of 264.97. See comment for 270.14(c)(2).

270.14(c)(6) or (7) or (8) The information does not contain sufficient information, supporting data, and analyses to establish either a detection monitoring program, a compliance monitoring program, or a corrective action program (depending on current groundwater quality between the proposed point of compliance and the property boundary).

270.21(b)(1) The application does not contain detailed plans and an engineering report, certified by a registered professional engineer, which describes a liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent subsurface soil at any time during the active life of any portion of the landfill that is not an existing portion. The application incorrectly construes the adjacent soil (i.e. the limit of the excavation) to be the "liner". Since a landfill liner must be constructed of materials that prevent wastes (e.g. leachate) from passing into itself during the active life of the facility, the gray silty clay unit is not acceptable as a liner. Other obstacles

to this concept include the inability to establish quality control during installation, and the inability to cover all surrounding earth likely to be in contact with the waste or leachate.

270.21(b)(5) The application does not contain detailed plans and an engineering report, certified by a registered professional engineer, describing control of wind dispersal of particulate matter.

Ford Motor Company Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	Electric Arc Furnace Baghouse Dust
EPA I.D. Number:	K061
Line Number on Part A Application:	1
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D346-75, ASTM D420-69, ASTM D140-70, ASTM D2234-76
Analytical Parameters, Frequency, Rationale, Method:	Chromium, Cadmium, Lead - Analyze yearly, verification of hazardous classification, EP Toxicity (40 CFR 261, Appendix II). Color - Verify each load, characteristic red, visual comparison. Particle Size - Verify each load, characteristic particle size (dust), visual comparison. Density - Analyze yearly, characteristic of waste, ASTM B212-76. Bearing Strength - Analyze yearly, characteristic of waste, ASTM D-2435, D-2166. Compatibility - Analyze yearly, assure integrity of leachate collection system and verify that waste mixtures do not generate harmful heat, gas, or explosions, mix materials together and note observations.

Ford Motor Company Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	Decanter Tar from Coking Operations
EPA I.D. Number:	K087
Line Number on Part A Application:	2
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D140-70 for extremely viscous liquids
Analytical Parameters, Frequency, Rationale, Method:	Phenol - Analyze yearly, verification of hazardous classification, SW-846 (8040).
	Naphthalene - Analyze yearly, verification of hazardous classification, SW-846 (8100).
	Color - Verify each load, characteristically black, visual comparison.
	Odor - Verify each load, characteristic smell, visual comparison.
	Free Liquids - Inspect each load, free liquids not acceptable, visual observation.
	Density - Analyze yearly, characteristic of waste, ASTM D-891.
	Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166.
	Compatibility - Analyze yearly, assure integrity of leachate collection system and verify that waste mixtures do not generate harmful heat, gas, or explosions, mix materials together and note observations.

Ford Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	Wastewater Treatment Sludge from Electroplating Operations
EPA I.D. Number:	F006
Line Number on Part A Application:	3
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D140-70 for extremely viscous liquids. ASTM D1452-65 for soil-like material
Analytical Parameters, Frequency, Rationale, Method:	Color - Verify each load, characteristically blue-green, visual comparison. Odor - Verify each load, no characteristic smell, visual comparison. Free Liquids - Inspect each load, free liquids not acceptable, visual observation. Density - Analyze yearly, characteristic of waste, ASTM D-891. Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166. Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

Ford Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	EP Toxic - Cadmium
EPA I.D. Number:	D006
Line Number on Part A Application:	4
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D140-70 for extremely viscous liquids. ASTM D346-75 for crushed or powdered material. ASTM D1452-65 for soil-like material. ASTM D2234-76 for fly ash-like material.
Analytical Parameters, Frequency, Rationale, Method:	Cadmium - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261, Appendix II). Color - Verify each load, characteristic color, visual comparison. Odor - Verify each load, no characteristic smell, visual comparison. Free Liquids - Inspect each load, free liquids not acceptable, visual observation. Density - Analyze yearly, characteristic of waste, ASTM D-891. Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166. Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

Ford Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	EP Toxic - Chromium
EPA I.D. Number:	D007
Line Number on Part A Application:	4
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D140-70 for extremely viscous liquids. ASTM D346-75 for crushed or powdered material. ASTM D1452-65 for soil-like material. ASTM D2234-76 for fly ash-like material.
Analytical Parameters, Frequency, Rationale, Method:	Chromium - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261 Appendix II). Color - Verify each load, characteristically black, visual comparison. Odor - Verify each load, characteristic smell, visual comparison. Free Liquids - Inspect each load, free liquids not acceptable, visual observation. Density - Analyze yearly, characteristic of waste, ASTM D-891. Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D2166. Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials, and note observations.

Ford Allen Park Clay Mine

MID 980568711

Waste Analysis Plan

Hazardous Waste Name:	EP Toxic - Lead
EPA I.D. Number:	D008
Line Number on Part A Application:	4
Detailed Analyses:	Refer to Attachment 9
Method of Disposal:	Landfill
Sample Method:	ASTM D140-70 for extremely viscous liquids. ASTM D346-75 for crushed or powdered material. ASTM D1452-65 for soil-like material. ASTM D2234-76 for fly ash-like material.
Analytical Parameters, Frequency, Rationale, Method:	Lead - Analyze yearly, verification of hazardous classification, EP toxicity (40 CFR 261 Appendix II). Color - Verify each load, characteristically black, visual comparison. Odor - Verify each load, characteristic smell, visual comparison. Free Liquids - Inspect each load, free liquids not acceptable, visual observation. Density - Analyze yearly, characteristic of waste, ASTM D-891. Bearing Strength - Analyze biannually, provision for waste stabilization, ASTM D-2435, D-2166. Compatibility - Analyze yearly, assure integrity of leachate collection system, and verify that waste mixtures do not generate heat, gas, or explosions. Mix materials and note observations.

6. Storm Water - Insure that storm water collected in the inactive areas does not come in contact with active work areas. Inspect integrity of diversion berms in the cell in order to maintain separation of active from inactive work areas. Inspect run-on and run-off diversion berms and dikes for erosion or general damage that would allow water into the waste management area.

7. Leachate System - Inspect the sampling manhole for proper flow recording and leachate sampling. Verify that system is in operating order and that monitor equipment is functioning. Inspect leachate discharge lines for damage or leakes especially the integrity of the clean out pipes. Check for vandalism of the electrical control boxes and the locks on the manhole covers.

8. Bulldozer - Insure bulldozer is operable.

9. Telephone - Insure operation of phone.

Weekly Items

1. Fire Extinguishers - Check the availiability and pressure gauges on the fire extinguishers. Extinguishers are in Manifest Trailer and mobile operating equipment.
2. Gauze Masks - Verify that the gauze masks are available.
3. Perimeter Fence - Look for locations where the fence is in disrepair.
4. Surface Drains - Look for blocked drainage or surface water contamination.

Weekly Items (cont'd)

5. Sediment Basin - Check the outflow for blocked drainage and surface water contamination.

6. Intermediate cover - Inspect all fill areas that do not have final cover to insure that intermediate cover is adequate. Inspect for erosion or other damage that could or has exposed wastes.

Quarterly Items

1. Monitor Wells - Inspect integrity of protective casings, including caps and locks.

2. Final cover - Inspect all areas which have received final cover for deep rooted vegetation, deterioration of vegetative cover, areas of surface erosion and other surface disturbances.

3. Fire Hydrant - Inspect for vandalism.

Attachment 16

HAZARDOUS WASTE
GENERAL INSPECTION SCHEDULE AND CHECKLIST
FORD MOTOR COMPANY - ALLEN PARK CLAY MINE LANDFILL MID980568711

	Date / Time	Note	Inspector	Note	Inspector	Note	Inspector	Note	Inspector	Note	Inspector	Note	Inspector	Note	Inspector
Daily Items															
Proper Disposal															
Gate Security															
Access Road															
Warning Signs															
Daily Cover															
Storm Water															
Leachate System															
Bulldozer															
Telephone															
Weekly Items															
Fire Extinguishers															
Gauze Masks															
Perimeter Fence															
Surface Drains															
Sediment Basin															
Quarterly Items															
Monitor Wells															
Final Cover															
Fire Hydrant															

( ) Refer to backside for notations and corrections to previous problem areas.
( ) Refer to Spill and Accident Prevention Plan for Procedures.

-over-

G-4n Landfill Leakage 40 CFR 264.52

The facility does not have a leak detection system because it has been demonstrated that liquid will not migrate into the liner during the life of the facility under the provisions of 40 CFR 264.90(b)(4).

G-5 Emergency Equipment and Power Sources 40 CFR 264.52(e)

Fire Extinguishers	- 1 for gas, oils, solvents, located at office trailer.
	- 1 for liquids, electrical, combustibles, located at office trailer.
	- 1 for liquids, electrical, combustibles, located at bulldozer.
Caterpillar D-7	- Wide-track bulldozer for spill containment, etc.
Telephone	- Located at office trailer.
Fire Hydrant	- Located north of entrance gate.

B-2b Additional Requirements for Land Disposal Facilities 40 CFR 270.14(c)

As provided by 264.90(b)(4), this facility is not subject to RCRA groundwater monitoring requirements (see Attachment 15, Groundwater Waiver Demonstration), and is therefore not subject to 270.14(c).

B-3b Floodplain Standard 40 CFR 270.14(b)(11)

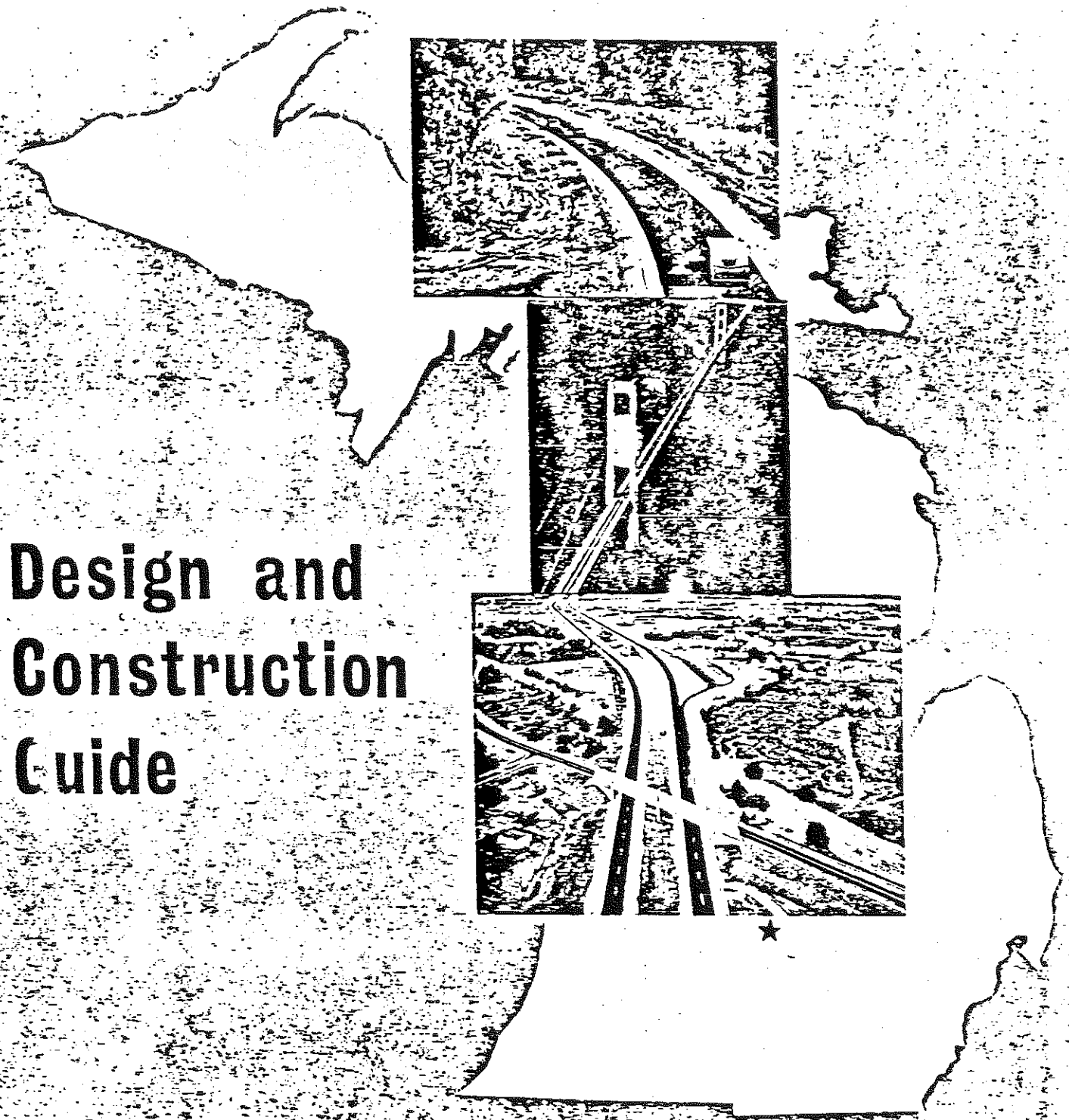
The site is not located within the 100 year floodplain as shown by Flood Insurance Rate Map Panel Number 260217 0002 B effective February 17, 1982 provided with the Engineering Drawings (Attachment 14).

B-4 Traffic Information 40 CFR 270.14(b)(10)

The site access road has supported the transportation of 4 million tons of clay and 8 million tons of waste since 1956. It was built and maintained with steel furnace slag, which provided an excellent subbase for the 25x high stability asphalt mix that was laid down in 1980. This steel furnace slag asphalt mix was laid down in a $2\frac{1}{2}$ inch base course, overlain by $1\frac{1}{2}$ inches of finish course. The specifications for the mix design are shown in Attachment 7 along with the MAPA Design and Construction Guide. Note that the facility belongs under a Traffic Class 7 (Medium-Heavy). The access road has been properly designed and constructed to handle traffic of this magnitude.

As of 1984, there has been no sign of cracking or distress in the asphalt. The pavement is 25' x 1000' with a 25' shoulder on each side. All incoming traffic stops at the end of this access road where the manifest check-in trailer is located. Refer to Attachment 8. Speed limit signs are posted at 15 mph.

The load bearing capacity and surfacing of the haul road within Cell II is addressed on pages 70.01A - 70.11A of Attachment 7A.



Design and Construction Guide

MAPA

MICHIGAN ASPHALT PAVING ASSOCIATION, INC.

MAY 11/1/84

ALLEN PARK CLAY MINE – HAUL ROAD BEARING CAPACITY
270.14 (b)(10) – TRAFFIC

ANALYSIS OF HAUL ROAD WITHIN CELL II

REFER TO REFERENCE MATERIAL ON ROAD ANALYSIS METHOD WHICH WAS SUBMITTED WITH ORIGINAL PART B APPLICATION.

TRAFFIC INDEX = 10

R VALUE OF NATIVE CLAY = 10

R VALUE OF BROKEN CONCRETE/SLAG ROAD FILL = 60

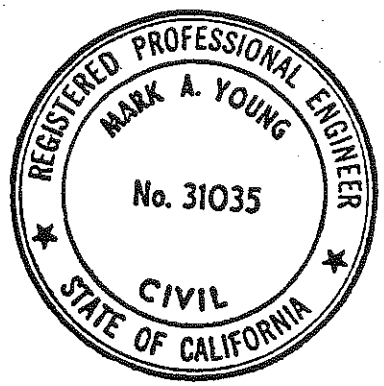
FROM FIGURE 8, GRAVEL EQUIVALENT FACTOR, G_f = 1.0

GRAVEL EQUIVALENT, GE, REQ'D FOR ROAD BASE = 0.0032 (T.I.)(100–R

GE = 0.0032 (10)(100 – 60) = 1.28

THICKNESS OF BASE MAT'L REQ'D = $\frac{GE}{G_f} = \frac{1.28}{1.00}$ = 1.28 FT = 16 IN

A MINIMUM OF 2 FEET OF BROKEN CONCRETE WITH SLAG WEARING SERVICE WILL BE PLACED OVER NATIVE CLAY FOR THE CELL II ACCESS ROAD.



FLEXIBLE PAVEMENT

STRUCTURAL SECTION

DESIGN GUIDE

FOR

CALIFORNIA CITIES AND COUNTIES

Revised January 1973

ACKNOWLEDGMENT

This revised guide was prepared through the cooperative efforts of the County Engineers Association of California, the League of California Cities and the California Division of Highways. Much appreciation is expressed to the various members and personnel of the above organizations who were responsible for the original design guide which was published in July 1968.

This revised version was prepared by George Sherman, Robert Smith, Joseph Hannon, George Dick and Karl Baumeister of the Materials and Research Department of the California Division of Highways. Credit should also be shared with Paul Wagner and George Ebenhack of the Design Department, Jack Kassel and Herman Woodruff of the City and County Liaison Department of the California Division of Highways, and W. R. Lovering of The Asphalt Institute, for their review and comment. Appreciation is also extended to the City and County Engineers who have reviewed the rough draft and contributed to this publication by their suggestions.

FOREWORD

This booklet is intended to provide a concise and useful tool to the designer of city streets and county roads.

The information in this guide has been updated since the last printing in July 1968, but the concepts and methods used herein are not new. However, a new section has been added which covers the design of full depth asphalt concrete pavements.

The guide is based on the results of extensive studies, tests and numerous reports by various agencies concerning the many factors affecting the structural design of roadway sections.

This guide should prove quite helpful to many cities and counties irrespective of the amount or lack of laboratory facilities and testing equipment.

Suggestions for improvements to this guide may be directed to either the County Engineers Association of California or the League of California Cities.

CALIFORNIA DESIGN METHOD

An empirical equation is used by the California Division of Highways for design of flexible pavement structural sections. This equation has its origin in test track data from the Brighton Test Road (1940-43) and the Stockton Airfield Test Track (1942). The test track constants used to develop this equation have since been modified based on results of the WASHO Road Test and, more recently, the AASHO Road Test. These constants have been adjusted to fit test track data to California pavement experience.

Factors Considered in the Design Equation

A. Effect of traffic - Thickness is a function of this factor (Traffic Index or TI).

B. Resistance value (R-value) of the supporting layer - Thickness is inversely related to the strength of the foundation material as indicated by the stabilometer test (R-value or R).

2. Strength of the pavement structure - Thickness is inversely proportional to the strength factor of the materials in the structural section (Gravel Factor or G_f).

D. The general thickness design equation may be expressed as follows:

$$\text{Thickness} = (\text{constant}) \frac{(\text{Effect of Traffic}) \quad (\text{Resistance to deformation of supporting layer})}{(\text{Strength factor of layer being designed})}$$

$$\text{Specifically } T = \frac{0.0032(TI) \quad (100-R)}{G_f}$$

For convenience, the relationships expressed in the design equation have been developed in graphical or tabular form, and will be considered in this manner in the further discussions.

EFFECT OF TRAFFIC (TI)

The effect of traffic on a roadway over its design life is expressed by the Traffic Index. To estimate this factor, it is first necessary to reduce the many different types of vehicles and loads to a common denominator. This common denominator is the 5,000 pound equivalent wheel load (EWL). The destructive effect of one passage of a given truck wheel is expressed as an equivalent number of passages of 5,000 pound wheel loads.

Estimation of the total number of EWL's on a section of road for a given period of time has been simplified by the use of truck constants. A truck constant is a number which represents the total number of 5,000 pound wheel loads which would be generated in one year by the passage of one truck per day in one direction. This truck is assumed to be carrying an average load which has been determined through statistical treatment of axle weight and frequency data. Each axle classification (e.g., 2-axle, 3-axle, etc.) has a separate truck constant. A method for calculating truck constants is shown in Appendix A.

If more accurate truck constants are desired, they should be calculated for the highway or street under consideration (3). Because of the cost, this would normally be done only for special situations where the engineer feels the traffic is unique and he needs the information to effect a savings or justify a heavier section. For the typical situation, the constants listed in Table A-5 of Appendix A may be used. These constants represent the results of statewide loadometer analyses. Most engineers using this manual will be concerned only with the second column of constants entitled "City Streets and County Roads" which were recently developed (3). The first column would be used in the design of roads and streets with a T.I. of 8 or more.

TYPE OF FACILITY	T.I.
Minor residential streets and cul-de-sacs.	4
Average residential streets.	4.5
Residential collectors and minor or secondary collectors.	5
Major or primary collectors providing for traffic movement between minor collectors and major arterials.	6
Farm-to-market roads providing for the movement of traffic through agricultural areas to major arterials.	5 - 7
Commercial roads (arterials serving areas which are primarily commercial in nature).	7 - 9
Connector roads (highways and arterials connecting two areas of relatively high population density).	7 - 9
Major city streets and thoroughfares and county highways.	7 - 9
Streets and highways carrying heavy truck traffic. This would include streets in heavily industrialized areas.	9+

For subdivision traffic only, it is permissible to use the chart shown in Figure 2. This chart relates Traffic Index to the number of houses served. It should be emphasized that this chart applies only to residential and residential collector streets. Streets carrying other traffic through the subdivision and streets going by a commercial area should not be analyzed by a house count chart.

Prior to the use of this chart, the engineer should consult with the area planners as to future plans for temporarily dead-ended streets. Many times either commercial developments tie into residential collectors, or the collectors are extended to serve much larger areas.

The chart is based upon each residence generating an average eight trips per day. Truck traffic is assumed to be three percent of the subdivision traffic. The truck traffic is assumed to consist, almost exclusively, of 2-axle and 3-axle vehicles. Truck constants

of 350 for the 2-axle, and 900 for the 3-axle trucks are based upon the common trucks found on these streets. Truck traffic is assumed to consist of 89% 2-axle, and 11% 3-axle trucks. Traffic Indices are based upon a ten-year design life for the facility.

Estimation of T.I. in Special Situations

Many times a particular road presents a unique situation which demands that the engineer use a little more judgment to arrive at a truly representative Traffic Index. An example of such a situation might occur where a road serves an agricultural or recreational area or has a heavily used rock quarry at some point along the route. Since the rock trucks would haul one way loaded and one way empty, the engineer could use a different T.I. for each direction of travel and effect significant economy in design.

QUALITY OF SUBGRADE SUPPORT (R)

The term "resistance", as used in this guide, refers to the ability of a material to resist lateral deformation when acted upon by a vertical load. When displacement occurs, the soil moves out and away from the applied load. This displacement of soil causes a "wave development" on all sides of the load. The object of the design procedure is to keep this displacement within certain limits, depending on traffic and surfacing.

Measurement of the resistance or R-value is made by means of the stabilometer test. An index of resistance to displacement is arranged on a scale from 0 to 100. Theoretically, water would have an R-value of 0 since it would transmit pressure equally in all directions, while steel would show an R-value of 100 since no measurable deformation would occur. Soils and aggregates will range from less than 5 to about 85.

The R-value is determined using soil specimens which are compacted in a manner to approximate the condition of soil in the field. The specimens are tested in a state as near to full moisture saturation as possible. Thus, the R-value represents the worst possible state the soil might attain at the typical field density state.

The procedure also takes into account the fact that some soils are expansive. When a compacted soil expands on exposure to free water, the density and particle arrangement of the mass are disrupted causing a lowering of the stability of the material. This is compensated for in the California design method by determining the expansive tendency of the soil at various water contents. If the expansion is found to be above that tolerable, the data is used to adjust the R-value downward. This results in design of a thicker cover layer because of the lower strength within the supporting soil caused by the water taken on during expansion.

ESTIMATION OF R-VALUE USING SOIL CLASSIFICATION AND SAND EQUIVALENT

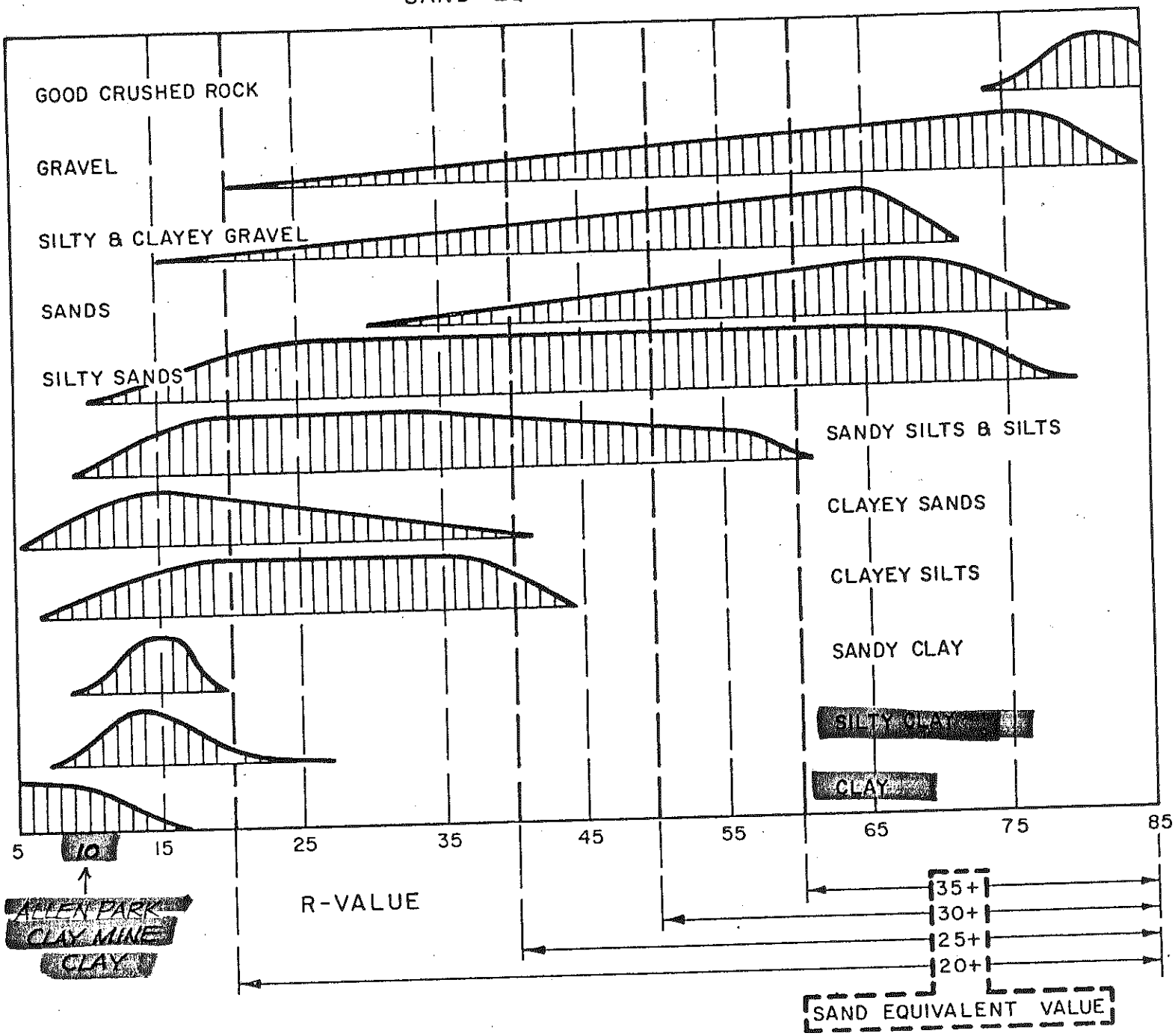


Figure 5

STRENGTH OF STRUCTURAL LAYERS (G_f)

The capacity of the structural section layers to resist the forces imposed by traffic is expressed in terms of their "gravel equivalent factor (G_f)". This is an empirical factor developed through research and field experience, which relates the relative strength of a unit thickness of the particular material (AC, CTB, Class 3 AS, etc.) in terms of an equivalent thickness of gravel. It is important to note that the various materials must meet certain quality requirements (grading, R-value, SE, etc.) in order to have the strength assumed for the gravel factor assigned.

G_f values assigned to the various construction materials are tabulated in Figure 8 and in Test Method No. Calif. 301. A graph illustrating the relationship between G_f for asphalt concrete and the Traffic Index is shown in Figure 6. This graph enables interpolation between the values shown in Figure 8 and allows the designer small advantages in economy if he chooses to design by the formula rather than by tables.

STRUCTURAL SECTION DESIGN PROCEDURE

Standard design procedure is shown in Test Method No. Calif. 301. This procedure uses the design formula and allows the designer to design each layer to the most economical thickness. Use of this formula requires three variables: T.I., R-value, and G_f.

The design chart shown in Figure 7 is taken from the test method, and offers a quicker approach to the design problem. Complete instructions for use of the chart are shown in Figure 8.

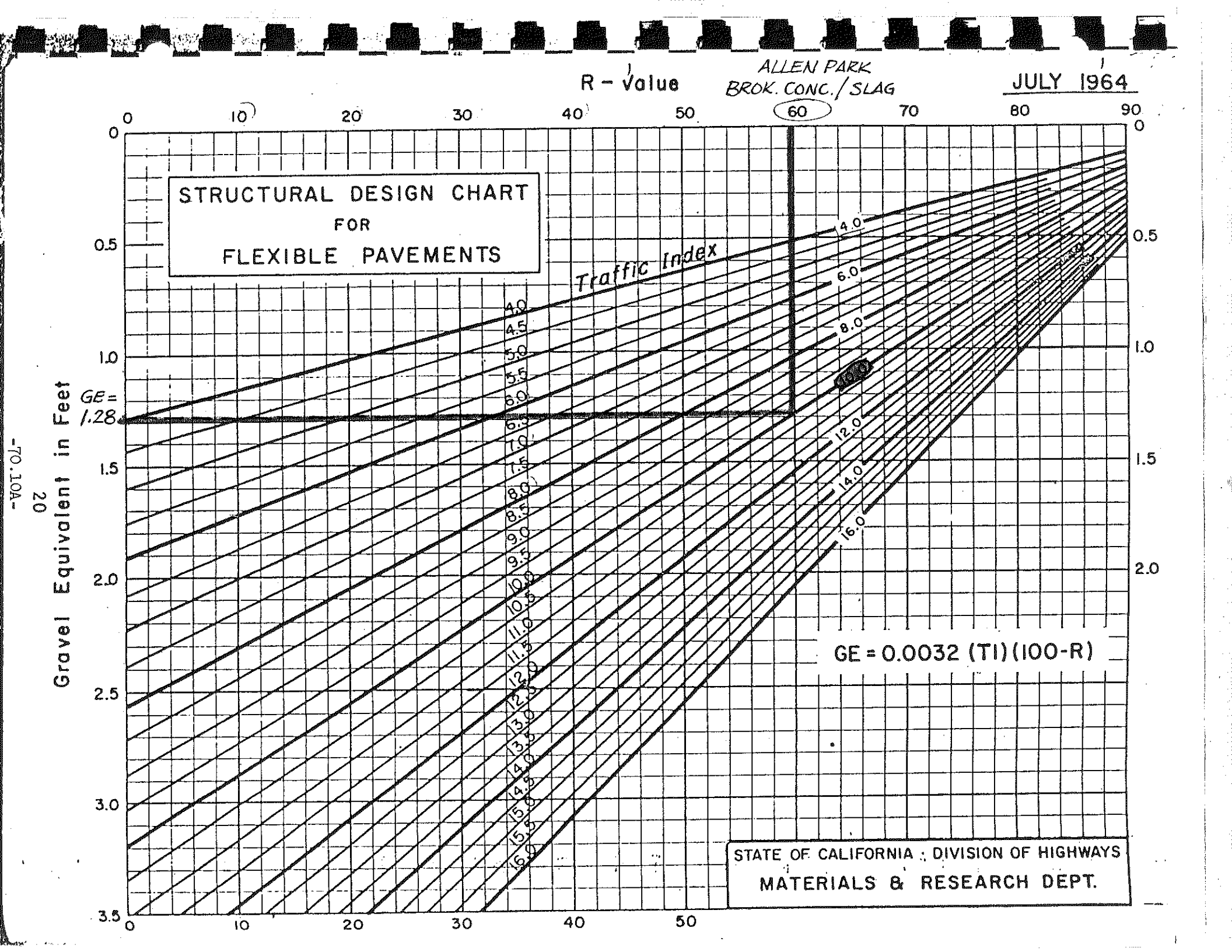

R - Value
ALLEN PARK
BROK. CONC./SLAG
JULY 1964
STRUCTURAL DESIGN CHART
FOR
FLEXIBLE PAVEMENTS
Traffic Index
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
10.5
11.0
11.5
12.0
12.5
13.0
13.5
14.0
14.5
15.0
15.5
16.0
GE = 1.28
Gravel Equivalent in Feet
GE = 0.0032 (TI)(100-R)
STATE OF CALIFORNIA : DIVISION OF HIGHWAYS
MATERIALS & RESEARCH DEPT.

FIGURE 8

INSTRUCTIONS FOR USE OF STRUCTURAL DESIGN CHART

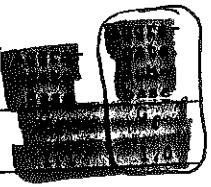
1. Find total GE - Intersect TI line with basement soil R-value line and read GE.
2. Select type of base to be used.
3. Find GE of surfacing - Intersect TI line with base material R-value line (Use R-80 for Class "B" CTB) and read GE. For Class "A" CTB select the surfacing thickness from Table III.
4. Find thickness of surfacing - Convert GE to actual thickness using $T=GE/G_f$ or if thickness was found in Table III solve for GE. Round off thickness to the nearest .05 foot or, preferably, to the next highest .05 foot and adjust the GE accordingly.
5. Find GE of surfacing + base - Intersect TI line with subbase material R-value line and read GE.
6. Find thickness of base - Subtract the adjusted GE found in Step 4 from the GE in Step 5 and convert the remainder to thickness using $T=GE/G_f$. Round off the thickness to the nearest .05 foot or, preferably, to the next highest .05 foot and adjust the GE accordingly.
7. Find thickness of subbase - Add the adjusted GE from Step 4 to the adjusted GE from Step 6, and subtract the result from the GE found in Step 1. Round off to the nearest .05 foot or, preferably, to the next highest .05 foot.

TABLE 1

Gravel Equivalents of Structural Layers in Feet

	ASPHALT CONCRETE Traffic Index (TI)										Cement-treated Base				
	5 and below	5.5 6.0	6.5 7.0	7.5 8.0	8.5 9.0	9.5 10.0	10.5 11.0	11.5 12.0	12.5 13.0	13.5 14.0	ETB	BTB and LTB	Class A		Class B	
	Gravel Equivalent Factor (G_f)											G_f	G_f		G_f	
Actual thickness of layer feet	2.50	2.32	2.14	2.01	1.89	1.79	1.71	1.64	1.57	1.52	1.3	1.2	1.7		1.2	
0.20	0.50	0.46	0.43	0.40	0.38	0.36	0.34	0.33	0.31	0.30	0.26	....	....	....	....	....
0.25	0.63	0.58	0.54	0.50	0.47	0.45	0.43	0.41	0.39	0.38	0.33	....	....	....	....	....
0.30	0.75	0.70	0.64	0.60	0.57	0.54	0.51	0.49	0.47	0.46	0.39	0.36	....	....	....	....
0.35	0.88	0.81	0.75	0.70	0.66	0.63	0.60	0.57	0.55	0.53	0.46	0.42	....	....	0.39	0.35
0.40	1.00	0.93	0.86	0.80	0.76	0.72	0.68	0.66	0.63	0.61	0.52	0.48	....	....	0.44	0.40
0.45	....	1.04	0.96	0.90	0.85	0.81	0.77	0.74	0.71	0.68	0.59	0.54	0.77	0.54	0.50	0.45
0.50	....	1.16	1.07	1.01	0.95	0.90	0.86	0.82	0.79	0.76	0.65	0.60	0.85	0.60	0.55	0.50
0.55	....	....	1.18	1.11	1.04	0.98	0.94	0.90	0.86	0.84	0.72	0.66	0.94	0.66	0.61	0.55
0.60	....	....	....	1.21	1.13	1.07	1.03	0.98	0.94	0.91	0.78	0.72	1.02	0.72	0.66	0.60
0.65	....	....	....	1.31	1.23	1.16	1.11	1.07	1.02	0.99	0.85	0.78	1.11	0.78	0.72	0.65
0.70	....	....	....	....	1.32	1.25	1.20	1.15	1.10	1.06	0.91	0.84	1.19	0.84	0.77	0.70
0.75	....	....	....	....	....	1.34	1.28	1.23	1.18	1.14	0.98	0.90	1.28	0.90	0.83	0.75
0.80	....	....	....	....	....	1.43	1.37	1.31	1.26	1.22	1.04	0.96	1.36	0.96	0.88	0.80
0.85	....	....	....	....	....	1.52	1.45	1.39	1.33	1.29	1.11	1.02	1.45	1.02	0.94	0.85
0.90	....	....	....	....	....	....	1.54	1.48	1.41	1.37	1.17	1.08	1.53	1.08	0.99	0.90
0.95	....	....	....	....	....	....	....	1.56	1.49	1.44	1.24	1.14	1.62	1.14	1.05	0.95
1.00	....	....	....	....	....	....	....	1.64	1.57	1.52	1.30	1.20	1.70	1.20	1.10	1.00
1.05	....	....	....	....	....	....	....	....	1.65	1.60	1.37	1.26	1.79	1.26	1.16	1.05

NOTES: ETB is emulsion treated base constructed with emulsified asphalt.
BTB is bituminous treated base constructed with asphalt.
LTB is lime treated base.
For the design of road-mixed asphalt surfacing, use 0.8 of the gravel equivalent factors (G_f) shown above for asphalt concrete.



ALLEN PARK BROK. CONC. & SLAG

E-2 Interim Status Groundwater Monitoring Data 40 CFR 270.14(c)(1), 40 CFR 265.90 40 CFR 265.94

During the facility's initial year of Interim Status (November 1980 - November 1981), a hydrogeological study was performed on the site which included the installation of five monitor wells in satisfaction of Federal and State regulations. Quarterly samples were then taken to provide initial background data, while at the same time additional information was being obtained to demonstrate that there is no potential for migration of liquid from the regulated unit to the uppermost aquifer during the active life of the unit.

Groundwater monitoring data obtained during Interim Status is provided in Attachment 16. The data is grouped as follows:

- EPA Primary Interim Status Drinking Water Standards Appendix III page 212
- Contamination Indicating Parameters page 221
- Additional Water Quality Parameters page 226

E-3 Aquifer Identification 40 CFR 270.14(c)(2)

There are two sand formations on site. The uppermost formation is a beach sand deposit that varies from 0-8' in thickness but is limited in regional extent due to excavations and construction projects in the vicinity. These sands are water bearing when the perimeter surface drain is in a state of efflux.

Since this formation lies above the disposal cell lined walls, there is no potential for migration of leachate from the regulated unit into this formation. However, to alleviate all concerns, the surficial sands lying adjacent to the disposal cell are to be removed during the 1985 construction season and replaced with compacted clay. Under these conditions, the provisions under 40 CFR 270.14(c)(2) thru 270.14(c)(8) do not apply.

The uppermost aquifer is then identified as being the sand formation lying approximately 80 feet below grade.

E-4 through E-8 not applicable per E-1.

D-6i Control of Wind Dispersal 40CFR 270.21 (b) (5)

The Facility Standard states that:

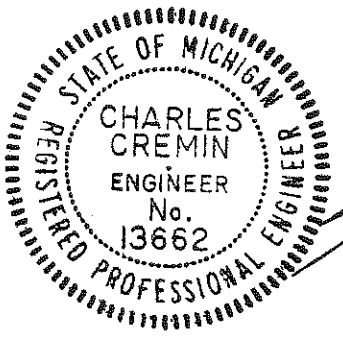
> "If the landfill contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the landfill to control wind dispersal."

Particulate emissions caused by wind erosion of landfill wastes or soil cover material can be minimized by various forms of physical, chemical or vegetative stabilization. Wind dispersal of landfilled wastes will be controlled primarily by regular compaction of waste material, and daily application of cover material over all exposed waste surfaces during the active life of the landfill. As individual cells are brought to final grade, the final clay cover and synthetic fabric top liner will be constructed over these areas, thus further sealing the landfill and isolating waste material from potential wind dispersal.

Wind dispersal of daily cover material must also be controlled. This will be done by application of dust settling water spray on a regular basis as necessary. Ford Motor Company presently has a 2500 gal. water tank truck on site on a full time basis. This is presently manned and operated by D & S Liquid Transport under a contract with Ford Motor Co. Ford will maintain this agreement or a similar one on a continuing basis for the life of the landfill. If necessary during extremely dry periods, they will also arrange for chemical stabilization applications through the same firm. Regular water spray applications will also be applied to interior unpaved access roads to control dust and blowing soils. Paved roads will be swept by mechanical sweepers at regular intervals to remove soil material.

Final cover and vegetative growth will be used to permanently stabilize the final landfill surface. Upon completion of the final clay and synthetic fabric cover, topsoil and seed, fertilizer and mulch will be applied to establish a final dense grass cover on the landfill.

This to certify that the above stated provisions of sections D-6f through D-6i are required to comply with the provisions of 40 CFR 270.21.



MIDWESTERN CONSULTING, INC.

Charles Cremin
Registered P. E. #13662 Mich.

(JD84030-AA)

Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

April 9, 1985

Attention: 5HS-13
U.S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, IL 60604

Re: Liner Compatibility Test Report
RCRA Part B Application
Ford Allen Park Clay Mine
E.P.A. I.D. No. [redacted]

Attention: 5HS-13:

Enclosed please find four copies of the subject waste/liner compatibility test report. Please insert the report between pages 109A and 110A of the above referenced Part B application.

Should you have any questions, please contact Mr. David Miller at (313) 322-0700.

Yours very truly,

Ben C. Trethewey, Manager
Mining Properties Department

DSM:dp

Enclosures

cc: Mr. Al Howard, MDNR

Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

FORD ALLEN PARK CLAY MINE LANDFILL
WASTE/LINER COMPATIBILITY TEST REPORT
RCRA PART B APPLICATION
E.P.A. I.D. NO. MID980568711

This laboratory report documents the testing of nine candidate flexible membrane liner (FML) materials for use in a hazardous waste landfill. The materials were tested for their original properties, their properties after exposure to distilled water and their properties after exposure to anticipated leachate. The polyethylene (high density) material was chosen for the Ford Allen Park Clay Mine Hazardous Waste Cell II liner as indicated by the Liner Report prepared by the engineering consulting firm of Neyer Tiseo & Hindo (page 104.1A of the Part B application).

CENTRAL LABORATORY

UNREINFORCED MATERIALS ORIGINAL PROPERTIES (ASTM D 638 Die 'C',20in(508) mm/Min.)	Polyethylene		PVC 1030		Buck-Tite		STAFF CPE Oil Resistant		Nobel CPE	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
Tensile Strength, psi(mpa)	4450(30.7)	4620(31.8)	3060(21.1)	2690(18.5)	7680(52.9)	7530(51.9)	1900(13.1)	1800(12.4)	2030(12.4)	1750(12.1)
Elongation, %	854	849	364	372	491	480	346	467	393	472
Modulus @ 100%, psi(mpa)	2040(14.1)	2130(14.7)	1570(10.8)	1370(9.5)	1540(10.6)	1500(10.3)	1175(8.1)	650(4.48)	1110(7.65)	740(5.11)
Modulus @ 200%, psi(mpa)	2080(14.1)	2170(14.9)	2104(14.5)	1826(12.6)	2125(14.7)	2025(14.0)	1420(9.8)	873(6.02)	1340(9.24)	905(6.25)
Modulus @ 300%, psi(mpa)	2100(14.5)	2170(15.0)	2635(18.2)	2310(15.9)	3310(22.8)	3160(21.8)	1705(11.8)	1156(7.97)	1628(11.2)	1135(7.83)
Hardness, pts 'D'	58	58	38	38	37	37	35	35	35	35
Tensile Set, %	575	700	10	10	20	20	155	160	230	210
Tear Strength, lb/in(kN/M) (ASTM D 624 Die 'C')	790(138)	840(147)	350(61)	352(62)	546(95.6)	560(98.0)	231(40.4)	181(31.0)	264(46.2)	231(40.4)
Puncture Resistance (FTMS 101 B, Method 2065, tested @ 200 mm/Min.)										
Sample Thickness, in(mm)	0.036(0.91)		0.030(0.76)		0.026(0.66)		0.030(0.66)		0.033(0.84)	
Pucnture Force, lbf(N)	50.8(226)		47.2(210)		95.5(425)		34.8(155)		42.7(190)	
Elongation, in(mm)	0.60(15.2)		0.83(21.1)		1.59(40.4)		0.90(22.9)		0.97(24.7)	
Bonded Seam Strength (ASTM D 412 Die 'A' samples cut across seam)										
Tensile Strength, psi(mpa)	3032(20.9)		2424(16.6)		6923(47.7)		1440(9.9)		1210(8.3)[1]	1435(9.9)[2]
Tensile Strength, % of orig.	65.6		90.1		91.9		80.0		69.1	82.0
Bonded Seam Peal Strength (ASTM D 413, 1X6in(25X300mm) strips 180° peel,50mm/Min)										
Peal Strength, lbf/in(kN/M)	85.4(14.9)		19.8(3.5)		39.3(6.9)		8.8(1.5)		1.8(0.3)[1]	2.4(0.4)[2]
Water Vapor Transmission (ASTM E 96 Method BW 30 Days)										
Rate $g/M^2/24h$	0.42		3.08		14.98		0.84		0.28	
Heat Resistance after 28 days 100°C (ASTM D 573)										
Tensile Strength change, %	-16	-32	+4	-1	-34	-16	+4	-12	-13	-2
Elongation change, %	-13	-10	-11	-12	+12	+19	+4	-6	+5	+4
Modulus @ 100% change, %	+7	+3	+34	+25	-19	-17	+16	+3	+5	+7
Modulus @ 200% change, %	+5	+3	+22	+18	-53	-35	+12	+3	+1	+6
Modulus @ 300% change, %	+6	+4	+13	+10	-27	-42	+5	+2	-6	-1
Hardness change, pts 'D'	+2	+2	+7	+5	-3	-3	0	0	0	0
Tear Strength change, %	+5	+6	+34	+21	-5	+6	+16	+44	+25	+9
Puncture Rresistance change, %	+4		+11		-38		+20		-3	

CENTRAL LABORATORY

	Polyethylene		PVC 1030		Duck-Tite		STAFF CPE Oil Resistant		Nobel CPE	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
Leachate Reistance after 30 days @ 50°C										
Tensile Strength change, %	+3	-16	-8	-1	-26	-21	-3	-21	-7	-5
Elongation change, %	-1	-10	+2	-1	+2	-8	0	-8	-2	-7
Modulus @ 100% change, %	+1	-3	-13	-8	-31	-27	-4	-18	-4	-10
Modulus @ 200% change, %	+1	-3	-9	-4	-35	-60	-1	-13	-4	-2
Modulus @ 300% change, %	+1	-1	-7	+2	-42	-36	0	-12	-2	+4
Hardness change, pts 'D'	+2	+2	-8	-8	+3	+3	-5	-5	-3	-3
Volume change, %	0		+2		+3		+15		+11	
Tear Strength change, %	+8	+2	+5	-5	-20	-19	-44	+1	0	+4
Puncture Rresistance change, %	-10		+6		-33		-17		-12	
Leachate Reistance after 60 days @ 50°C (ASTM D 471)										
Tensile Strength change, %	+6	-3	-9	-5	-25	-28	-7	-15	-7	-6
Elongation change, %	-10	-15	+1	-3	+4	-8	-11	+5	+3	-5
Modulus @ 100% change, %	+6	-1	-10	-8	-27	-31	-6	-14	-2	-12
Modulus @ 200% change, %	+6	-2	-9	-6	-29	-60	-1	-12	-1	-6
Modulus @ 300% change, %	+5	-2	-6	-5	-36	-29	+1	-15	-4	-5
Volume change, %	+1		+3		+3		+1		+14	
Hardness change, pts 'D'	+2	+2	-8	-8	+1	+2	-5	-5	-5	-5
Tear Strength change, %	+5	+2	-5	-8	-19	-23	-9	+4	+18	-8
Puncture Rresistance change, %	-8		-14		-41		-18		-9	
Leachate Reistance after 90 days @ 50°C (ASTM D 471)										
Tensile Strength change, %	+12	-35	-5	-6	-30	-30	+4	-16	-14	-17
Elongation change, %	-2	-12	-3	0	+5	+4	-5	-3	-1	-3
Modulus @ 100% change, %	+1	-3	-8	-8	-28	-31	-2	-15	+7	-10
Modulus @ 200% change, %	0	-3	-6	-5	-34	-62	+4	-16	+1	-4
Modulus @ 300% change, %	+1	-2	-5	-6	-43	-42	+5	-13	-6	-6
Volume change, %	0		+4		+5		+12		+15	
Hardness change, pts 'D'	+2	+2	-8	-8	-1	-1	-6	-5	0	-2
Tear Strength change, %	+3	+1	+11	-6	-16	-24	-10	0	+4	-5
Puncture Rresistance change, %	-3		-17		-29		-14		+1	
Leachate Reistance after 120 days @ 50°C (ASTM D 471)										
Tensile Strength change, %	0	-14	-2	+3	-29	-28	+4	-17	-4	+1
Elongation change, %	-5	0	+10	+9	+18	+23	+7	-5	-2	-2
us @ 100% change, %	+5	+2	-13	-7	-24	-28	0	-15	+20	+4
Modulus @ 200% change, %	+6	+1	-10	-4	-34	-62	+4	-13	+14	+9
Modulus @ 300% change, %	+7	+2	-10	-4	-46	-45	+3	-18	+7	+7
Volume change, %	-1		-8		+4		+19		+16	
Hardness change, pts 'D'	+2	+2	-8	-8	+3	+3	-5	-5	0	0
Tear Strength change, %	+9	+9	+4	-6	-16	-20	+7	+15	+18	+13
Puncture Rresistance change, %	+6		-7		-43		+9		-6	

	Polyethylene		PVC 1030		Buck-Tite		STAFF CPE Oil Resistant		Nobel CPE	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
Distilled Water Resistance after 30 Days @ 50°C (ASTM D 471)										
Tensile Strength change, %	+5	+2	-11	-6	-27	-22	+2	-23	-6	+13
Elongation change, %	-6	-7	-6	-4	+4	+1	-24	-25	+3	-20
Modulus @ 100% change, %	+1	-2	-12	-7	-31	-28	-1	-25	-7	-10
Modulus @ 200% change, %	+1	-2	-8	-4	-35	-60	+12	-12	-6	+9
Modulus @ 300% change, %	+1	-1	-7	-4	-41	-37	0	0	+7	+28
Volume change, %	0		+3		+2		+37		0	
Hardness change, pts 'D'	+2	+2	-3	-3	+3	+3	-12	-12	-3	-3
Tear Strength change, %	+4	+5	-6	-12	-17	-11	-5	+8	+23	
Puncture Resistance change, %	+1		-7		-34		-14		-15	
Distilled Water Resistance after 60 Days @ 50°C (ASTM D 471)										
Tensile Strength change, %	-11	-27	-12	-5	-29	-25	-13	-37	+3	+4
Elongation change, %	-10	-2	-1	+7	-2	+2	-24	-29	-19	-30
Modulus @ 100% change, %	+1	-2	-13	-7	-33	-35	-9	-34	+11	-14
Modulus @ 200% change, %	+1	-2	-10	-6	-35	-63	+1	-24	+14	+13
Modulus @ 300% change, %	+1	-1	-10	-9 -41	-38	---	-14	+28	+34	
Volume change, %	0		+5		+2		+56		+37	
Hardness change, pts 'D'	+2	+2	-3	-3	-5	-5	-15	-15	-10	-10
Tear Strength change, %	+5	+1	-7	-17	-17	-13	-17	-28	-5	-3
Puncture Resistance change, %	-5		-15		-40		-32		-22	
Distilled Water Resistance after 90 Days @ 50°C (ASTM D 471)										
Tensile Strength change, %	+7	+5	-9	-2	-26	-22	-11	-48	+3	+11
Elongation change, %	-10	-6	-1	+2	+2	+7	-38	-34	-26	-31
Modulus @ 100% change, %	+3	-1	-10	-7	-24	-22	-7	-37	+12	-19
Modulus @ 200% change, %	+3	-1	-5	-6	-31	-58	+5	-32	+30	+4
Modulus @ 300% change, %	+4	0	-4	-5	-38	-36	---	-27	---	+22
Volume change, %	0		+6		+2		+86		+59	
Hardness change, pts 'D'	+2	+2	-6	-5	-2	-2	-28	-28	-22	-22
Tear Strength change, %	+4	+2	-6	-15	-21	-19	-18	-23	+6	-12
Puncture Resistance change, %	-11		-12		-37		-48		-14	
Distilled Water Resistance after 120 Days @ 50°C (ASTM D 471)										
Tensile Strength change, %	-24	-32	-7	+1	-28	-21	-9	-51	+13	+1
Elongation change, %	-3	-2	+8	+6	+28	+28	-38	-35	-5	-25
Modulus @ 100% change, %	+2	+2	-18	-3	-24	-23	-1	-32	+14	-1
Modulus @ 200% change, %	+2	+2	-9	-4	-31	-60	+8	-29	+15	+11
Modulus @ 300% change, %	+2	+8	-18	-4	-42	-41	---	-27	+15	+24
Volume change, %	-2		+8		+2		+118		+9	
Hardness change, pts 'D'	+2	+2	-6	-5	-5	-4	-28	-28	-5	-15
Tear Strength change, %	+7	+5	-1	+1	-5	-13	-16	-18	+26	+6
Puncture Resistance change, %	+13		-8		-38		-51		-3	

REINFORCED MATERIALS

	#1008 PVC		#3510 CPE		#9210 Hypalon		Noble CPE Supported	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
Original Properties								
(ASTM D 751 1x6in(25x300mm) strips)								
Thickness, in(mm)	0.034(0.8)	0.034(0.8)	0.036(0.9)	0.035(0.9)	0.039(1.0)	0.038(1.0)	0.053(1.3)	0.055(1.4)
Tensile at Fabric Break, Lbf/in(kN/M)	355(62.1)	315(55.1)	178(34.2)	136(23.3)	182(31.9)	143(25.0)	176(30.8)	141(24.7)
Elongation at Fabric Break, %	30	42	32	40	30	44	40	35
Ultimate Tensile Strength, lbf/in(kN/M)	355(62.1)	315(55.1)	28(4.9)	26(4.6)	29(5.1)	25(4.4)	65(11.4)	80(14.0)
Ultimate Elongation, %	30	42	570	665	182	350	226	610
Modulus @ 100%, lbf/in(kN/M)	-------	-------	15(2.6)	11(1.9)	26(4.6)	21(3.7)	56(9.8)	79(13.8)
Modulus @ 200%, lbf/in(kN/)	-------	-------	18(3.2)	14(2.5)	30(5.3)	22(3.9)	64(11.2)	45(7.9)
Modulus @ 300%, lbf/in(kN/M)	-------	-------	22(3.9)	18(3.2)	-------	25(4.4)	-------	52(9.3)

Puncture Resistance					
(FTMS 101B, Method 2065, tested at 200mm/Min)					
Sample Thickness, in(mm)	0.034(0.9)	0.036(0.9)	0.038(0.9)	0.059(1.5)	
Puncture Force, lbf(N)	135(600)	32.2(148)	61.8(275)	81.6(363)	
Elongation, in(mm)	0.42(10.7)	0.58(14.7)	0.39(10.0)	0.65(16.6)	
Bonded Seam Strength					
(ASTM D 412 1x6in(25x300mm) strips)					
Tensile at Fabric Break, Lbf/in(kN/M)	252(44.1)	61.8(10.8)	107(18.7)	138(24.2)[1]	129(22.6)[2]
Tensile at Fabric Break, % of orig., %	80.0	44.8	74.7	97.9	91.5

[1] Dielectric Welded Seams
[2] Solvent Welded Seams

Bonded Seam Peal Strength					
(ASTM D 413, 1X6in(25X300mm) strips					
180° peel,50mm/Min)					
Peal Strength, lbf/in(kN/M)	29.2(5.1)	4.5(0.8)	24.7(4.3)	18.5(3.2)[1]	2.7(0.5)[2]

Water Vapor Transmission				
(ASTM E 96 Method BW 30 Days)				
Rate $g/M^2/24h$	2.52	0.98	1.12	0.28

Heat Resistance after 28 days 100°C								
(ASTM D 573)								
Thickness change, %	0	0	-3	+3	0	0	0	0
Tensile at Fabric Break change, %	-11	-14	-3	-7	+3	+15	+15	+15
Elongation at Fabric Break change, %	-7	-17	-12	-15	0	-18	-10	-14
Ultimate Tensile Strength change, %	-11	-14	-4	0	+38	+40	-22	-24
Ultimate Elongation change, %	-7	-17	-73	-31	-80	-85	-79	-10
Modulus @ 100% change, %	----	----	+67	+54	---	---	---	-40
Modulus @ 200% change, %	---	----	+50	+17	--	---	---	+26
Modulus @ 300% change, %	----	----	---	+14	---	---	---	+2
Puncture Resistance change, %	-8	-52	+32	+9				

CENTRAL LABORATORY

Leachate Resistance after 30 days @ 50°C	#1008 PVC		#3510 CPE		#9210 Hypalon		Noble CPE Supported	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
(ASTM D 471)								
Thickness change, %	+3	0	-3	0	0	0	0	-2
Tensile at Fabric Break change, %	0	-6	-15	-35	-12	+12	-3	+1
Elongation at Fabric Break change, %	+20	0	-3	0	-13	-4	-10	+20
Ultimate Tensile Strength change, %	0	-6	-25	-43	+31	+7	+14	-1
Ultimate Elongation change, %	+20	0	+27	+75	+75	-14	+42	+35
Modulus @ 100% change, %	---	---	-40	+100	-8	+5	-2	-62
Modulus @ 200% change, %	---	---	-44	-56	+3	+23	0	-15
Modulus @ 300% change, %	---	---	-50	-54	---	+28	---	-17
Puncture Resistance change, %	-13		-12		-3		-16	
Leachate Resistance after 60 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	-3	0	0	0	+2	-2
Tensile at Fabric Break change, %	-3	-2	-24	-59	-13	-1	+14	-4
Elongation at Fabric Break change, %	-3	-17	+6	+18	0	-10	-10	+3
Ultimate Tensile Strength change, %	-3	-2	-21	-29	+40	+24	+20	-24
Ultimate Elongation change, %	-3	-2	+23	+49	+69	-13	+25	-14
Modulus @ 100% change, %	---	---	-47	-33	-15	-5	+23	-49
Modulus @ 200% change, %	---	---	-50	-61	+3	+18	+14	-11
Modulus @ 300% change, %	---	---	-46	-64	---	+24	---	-11
Puncture Resistance change, %	-17		-20		-3		-16	
Leachate Resistance after 90 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	-3	+3	0	0	0	-2
Tensile at Fabric Break change, %	-4	-17	-23	-24	-8	+10	-8	-21
Elongation at Fabric Break change, %	-10	-21	-16	0	+3	-9	0	-3
Ultimate Tensile Strength change, %	-4	-17	-14	-25	+55	+36	+17	0
Ultimate Elongation change, %	-10	-21	-23	-5	+55	-30	+39	-10
Modulus @ 100% change, %	---	---	-20	-50	+4	+14	+23	-46
Modulus @ 200% change, %	---	---	-28	-61	+13	+50	+9	-7
Modulus @ 300% change, %	---	---	-27	-64	---	+36	---	-4
Puncture Resistance change, %	-13		-26		-8		-10	
Leachate Resistance after 120 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	-6	+3	0	0	+4	-2
Tensile at Fabric Break change, %	-7	-14	-27	-3	-6	+4	+14	0
Elongation at Fabric Break change, %	-20	-2	-6	0	+13	-7	0	-3
Ultimate Tensile Strength change, %	-7	-14	-22	-24	+55	+24	+18	-5
Ultimate Elongation change, %	-21	-2	+58	+32	+75	-2	+55	+16
Modulus @ 100% change, %	---	---	-40	-47	-4	+14	+14	-54
Modulus @ 200% change, %	---	---	-50	-56	+13	+27	+8	-11
Modulus @ 300% change, %	---	---	-55	-59	---	+36	---	-19
Puncture Resistance change, %	-14		-8		-5		-2	

CENTRAL LABORATORY

Distilled Water Resistance after 30 days @ 50°C	#1008 PVC		#3510 CPE		#9210 Hypalon		Noble CPE Supported	
	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.	Parallel	Perpen.
(ASTM D 471)								
Thickness change, %	0	0	0	+3	0	0	+2	-4
Tensile at Fabric Break change, %	-5	-12	-41	-31	-12	+9	-14	-17
Elongation at Fabric Break change, %	-7	-10	-6	+150	+13	+9	-20	-14
Ultimate Tensile Strength change, %	-5	-12	-54	-32	+38	+20	+23	-5
Ultimate Elongation change, %	-7	-10	-25	+40	+130	+29	+24	-20
Modulus @ 100% change, %	---	---	0	-20	-27	-14	+32	-54
Modulus @ 200% change, %	---	---	-28	-56	-13	+14	+12	0
Modulus @ 300% change, %	---	---	-36	-59	---	+8	---	+4
Puncture Resistance change, %	-13		-29		-9		-8	
Distilled Water Resistance after 60 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	0	0	0	0	+2	-7
Tensile at Fabric Break change, %	-4	+1	-25	-43	-16	+9	+10	+9
Elongation at Fabric Break change, %	-7	-14	+19	-12	-7	-4	-10	-3
Ultimate Tensile Strength change, %	-4	+1	-46	-54	+38	+28	+26	-13
Ultimate Elongation change, %	-7	-14	-8	-38	+90	+9	+35	-20
Modulus @ 100% change, %	---	---	-40	+40	-15	-14	+7	-62
Modulus @ 200% change, %	---	---	-50	-12	-3	+8	+12	-13
Modulus @ 300% change, %	---	---	-50	-54	---	+8	---	-2
Puncture Resistance change, %	-12		-30		-21		-20	
Distilled Water Resistance after 90 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	-3	+3	0	0	+2	-6
Tensile at Fabric Break change, %	-13	-11	-17	-39	-16	0	-13	-2
Elongation at Fabric Break change, %	-20	-24	-6	+25	-3	-4	+12	0
Ultimate Tensile Strength change, %	-13	-11	-43	-54	+48	+32	+29	-12
Ultimate Elongation change, %	-20	-24	-46	-43	+89	0	+15	-29
Modulus @ 100% change, %	---	---	-13	+67	+23	-5	+9	-61
Modulus @ 200% change, %	---	---	-39	-50	-3	+14	+14	-16
Modulus @ 300% change, %	---	---	-41	-46	---	+24	---	-15
Puncture Resistance change, %	-19		-2		-13		-7	
Distilled Water Resistance after 120 days @ 50°C								
(ASTM D 471)								
Thickness change, %	0	0	-6	+3	0	+3	+6	-6
Tensile at Fabric Break change, %	-8	-16	-24	-44	-21	-1	+3	+7
Elongation at Fabric Break change, %	-10	-2	-12	-25	0	-4	0	0
ıate Tensile Strength change, %	-8	-16	-46	-46	+31	+20	+20	-30
Ditimate Elongation change, %	-10	-2	-58	-32	+153	+26	+62	-12
Modulus @ 100% change, %	---	---	+88	-47	-31	-24	+11	-52
Modulus @ 200% change, %	---	---	-28	-50	-23	-9	+7	-16
Modulus @ 300% change, %	---	---	-46	-46	---	0	---	-16
Puncture Resistance change, %	-19		+22		-19		-19	

Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

July 10, 1984

RCRA Activities
Part B Permit Application
U.S. EPA Region V
P. O. Box A 3587
Chicago, IL 60690 - 3587

Attention: 5HW-13

Subject: Ford Allen Park Clay Mine
Part B Permit Application
MID 980568711

Pursuant to your letter of January 16, 1984, Ford Motor Company Allen Park Clay Mine herewith submits its "Part B" application in quadruplicate for a hazardous waste management facility permit under Section 3005 of the Resource Conservation and Recovery Act of 1976.

This application package includes both "Part A" (revised) fulfilling the requirements of 40 CFR 270.13, and "Part B" fulfilling the requirements of 40 CFR 270.14 and 270.21.

A revised "Part A" is submitted to make a complete single application document. The revision reflects the reduction in process design capacity and the incorporation of four additional waste types into the facility's waste management capability. This submittal is also consistent with direction received from Mr. Joe Boyle of EPA Region V at a meeting held in your offices on June 5, 1984 and subsequent telephone conversations.

The "Guidance for Permit Application Preparation" document was utilized in this submittal. We believe that this application is complete in that all of the requirements of 40 CFR 264 and 270 are addressed in detail. The only remaining technical issue is the data which characterizes the proposed additional waste types. This information will be provided to complete Section C when the wastes become available.

Should you have any questions concerning the Ford Allen Park Clay Mine "Part B" application, please contact me at (313) 594-2242.

Yours very truly,

Ben C. Trethewey, Manager
Mining Properties Department

Attachments

cc: Mr. Alan J. Howard, MDNR

Ford Allen Park Clay Mine

MID 980568711

Part "B" Application

Table of Contents

Ford Allen Park Clay Mine

MID 980568711

Part "B" Application

List of Attachments

Ford Allen Park Clay Mine

MID 980568711

Section A Part A Application

This section contains the Ford Motor Company Allen Park Clay Mine Part "A" Application and Amendments in addition to the present revision of July 10, 1984. The Allen Park Clay Mine facility now operates under the EPA interim status standards in conjunction with applicable state rules and regulations.

The Part "A" Application and Amendments will be retained "on-site" and as an integral section of the Part "B" Application.

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F	M	I	D	9	8	0	5	6	8	7	1	T/A	C
													1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

C 8 — FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)* — YR. | MO. | DAY

☐ 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN — YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☒ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C).*

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below):* A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP T/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	D80	646	A		7				
2					8				
3					9				
4					10				

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** – For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate **all** the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

Continued from page 2.

NOTE Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)														FOR OFFICIAL USE ONLY													
W	M	I	D	9	8	0	5	6	8	7	1	1		1	W				DUP					T/A	C	2	DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K061	19,074	T	D80	
2	K087	5,270	T	D80	
3	F006	20,000	T	D80	
4	D006	60,000	T	D80	
5	D007		T	D80	Included with above
6	D008		T	D80	Included with above
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F: M I D 9 8 0 5 6 8 7 1 1 | T/A: | C: 6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
42 17 00 N	083 12 21 W

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E:	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F:	G:		

IX. OWNER CERTIFICATION

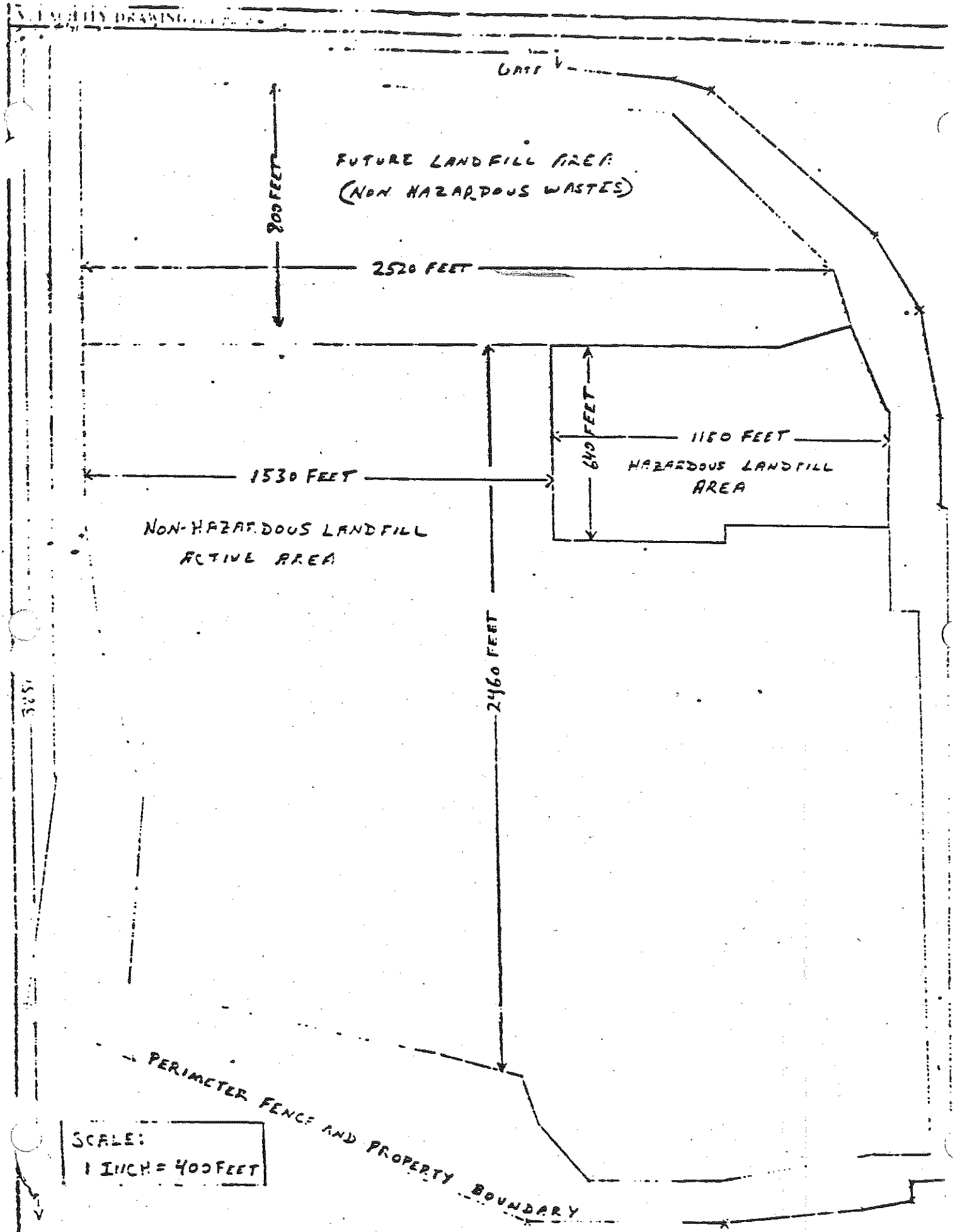
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
Paul T. Sullivan - Rouge Steel Co. By delegation of authority	Paul T. Sullivan	7-10-84

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED


GATE
FUTURE LANDFILL AREA
(NON HAZARDOUS WASTES)
800 FEET
2520 FEET
640 FEET
1160 FEET
HAZARDOUS LANDFILL
AREA
1530 FEET
NON-HAZARDOUS LANDFILL
ACTIVE AREA
2460 FEET
PERIMETER FENCE AND PROPERTY BOUNDARY
SCALE:
1 INCH = 400 FEET

Executive Vice President
Ford Diversified Products Operations

June 21, 1983

Paul T. Sullivan
President
Rouge Steel Company
3001 Miller Road
Dearborn, Michigan 48121

Pursuant to authority redelegated to me by the President of Ford Motor Company (the "Company"), I hereby delegate to Paul T. Sullivan authority to take such action as he may deem necessary or appropriate with respect to assets of the Company included as a part of the assets of the former Steel Division of the Company but not transferred to Rouge Steel Company, up to the levels of authority of a Divisional General Manager of the Company as described in the Capital Assets section of the Executive Authorities Manual issued from time to time by the Company.

This authority supercedes my April 18, 1983 redelegation to Mr. P. T. Brosnahan.

T. C. Page

cc: Sidney Kelly

Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

June 30, 1983

U. S. Environmental Protection
Agency
Region V
RCRA Activities
P. O. Box A3587
Chicago, IL 60690

Subject: Revised RCRA Part A Permit Application
Ford Allen Park Clay Mine Landfill
E.P.A. I.D. #MID980568711

Gentlemen:

Attached is a revised RCRA Part A Permit Application for the above referenced Ford Motor Company facility.

The process design capacity of the facility and the estimated annual quantities of hazardous wastes have been modified as indicated on the attached revised forms, consistent with current operations and projected development of the site. The information is consistent with the facility's Michigan Act 64 Hazardous Waste Disposal Facility Operating license issued by the Michigan DNR on October 22, 1982.

If you have any questions concerning these changes, please contact Mr. David S. Miller of my staff on 313/322-0700.

Yours very truly,

Ben C. Trethewey, Manager
Mining Properties Department

Attachment

bcc: Messrs. J. S. Amber
A. Basse
J. A. Esper
G. Kircos
S. H. Vaughn

FORM 3510-3 RCRA

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: I M I D 9 8 0 5 6 8 7 1 1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr. mo. & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[ ] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete Item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

[ ] 2. NEW FACILITY *(Complete Item below.)*

FOR NEW FACILITIES PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[X] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	D 8 0	949	A		7				
					8				
					9				
4					10				

...CAPACITY

V. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four-digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four-digit number(s) from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

D(1). PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

D(2). PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 500 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 3 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

EPA Form 3510-2 (5-80) PAGE 2 OF 5 CONTINUED ON PAGE 3

USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. (enter from page 1)

M I D 9 8 0 5 6 8 7 1 1

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
42 17 06 N	083 12 21 W

VIII. FACILITY OWNER

X A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER | 2. PHONE NO. (area code & no.)

3. STREET OR P.O. BOX | 4. CITY OR TOWN | 5. ST. | 6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)

P. T. Sullivan - Ford Motor Co.
By Delegation of Authority

B. SIGNATURE

Paul T. Sullivan

C. DATE SIGNED

7-1-83

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)

B. SIGNATURE

C. DATE SIGNED

EPA Form 3510-1

FOR OFFICIAL USE ONLY

EPA I.D. NUMBER	W I D 9 8 0 5 6 8 7 1 1
	W DUP 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	K 0 6 1	19,074	T	D 8 0	
2	K 0 8 7	5,270	T	D 8 0	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
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17					
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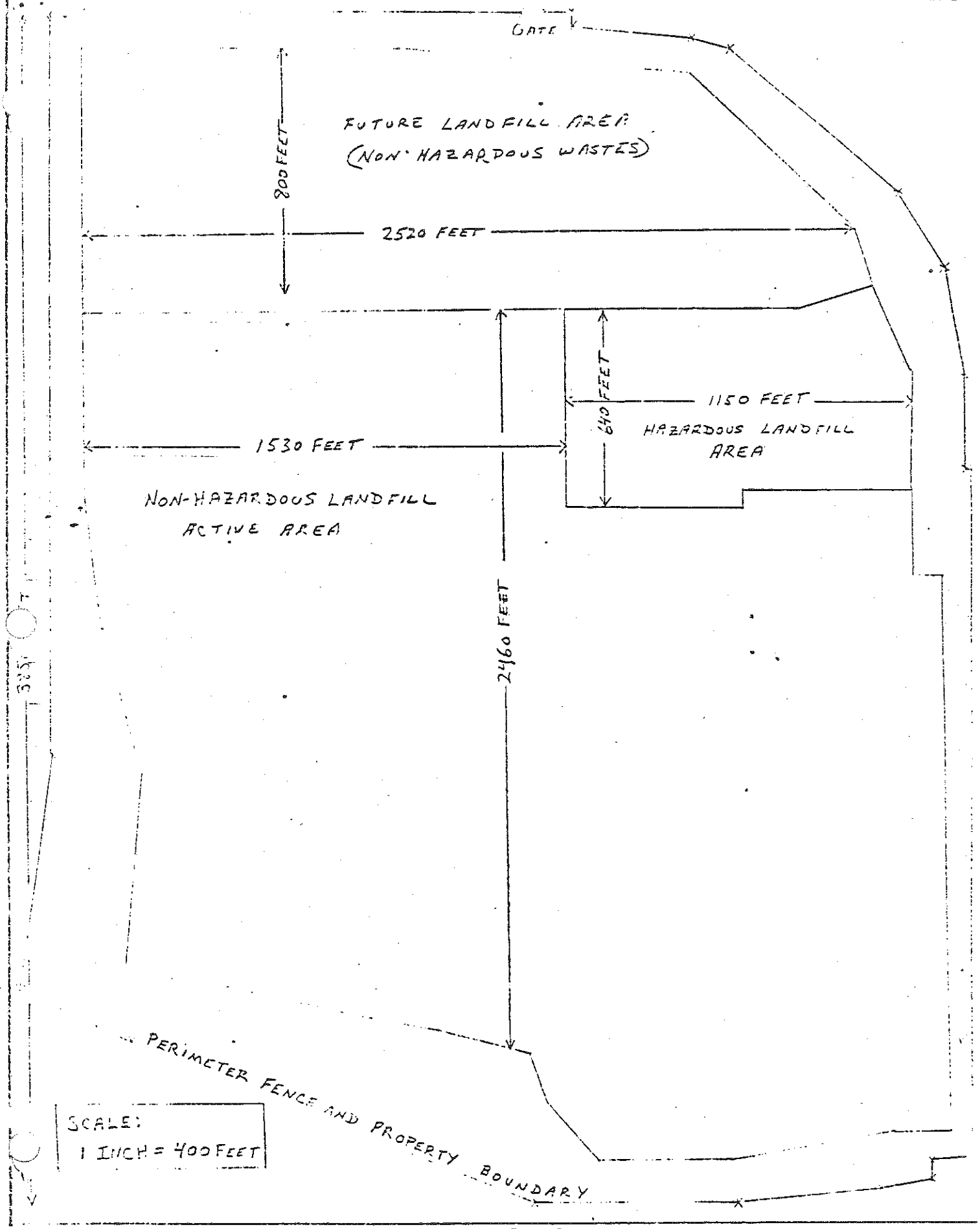
20					
21					
22					
23					
24					
25					
26					

V. FACILITY DRAWING (CONT'D)



Executive Vice President
Ford Diversified Products Operations

June 21, 1983

Paul T. Sullivan
President
Rouge Steel Company
3001 Miller Road
Dearborn, Michigan 48121

Pursuant to authority redelegated to me by the President of Ford Motor Company (the "Company"), I hereby delegate to Paul T. Sullivan authority to take such action as he may deem necessary or appropriate with respect to assets of the Company included as a part of the assets of the former Steel Division of the Company but not transferred to Rouge Steel Company, up to the levels of authority of a Divisional General Manager of the Company as described in the Capital Assets section of the Executive Authorities Manual issued from time to time by the Company.

This authority supercedes my April 18, 1983 redelegation to Mr. P. T. Brosnahan.

T. C. Page

cc: Sidney Kelly

Steel Division
Ford Motor Company

3001 Miller Road
Dearborn, Michigan 48121

June 5, 1981

Permit Contact (5EP)
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Subject: Revised RCRA Part A Permit Application:
Ford Allen Park Clay Mine Landfill
EPA I.D. Number MIT 270010093

Attached is a revised RCRA Part A Permit Application for the above-referenced Ford Motor Company facility.

The specific source hazardous waste K087, decanter tank tar sludge from coking operations, should be added to our permit application. This is in accordance with 46 FR 4619, as published in the January 16, 1981 Federal Register.

The waste previously identified as F016, dewater air pollution control scrubber sludges from coke ovens and blast furnaces, was removed from the list by EPA on November 12, 1980 (45 FR 74888) and should be deleted from our permit application dated November 17, 1980. The original permit application also indicated that two unspecified wastes identified with EPA I. D. Numbers D003, D005 and D008 would be handled by this facility. Because this is no longer the case, these identified wastes should be deleted from the application. The attached revision shows Page 3 of the Permit Application as it should now appear.

If you have any questions concerning these changes, please advise.

Very truly yours,

Ben C. Trethewey, Manager
Mining Properties Department

attachment

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S20004

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: F M I T 2 7 0 0 1 0 0 9 3

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C 8 | YR. | MO. | DAY

☐ 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☒ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.

1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP Y/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1					7				
2					8				
3					9				
4					10				

EPA Form 3510-3 (6-80) PAGE 1 OF 5 CONTINUE ON REVERSE

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non—listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

CONTINUE ON PAGE 3

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)															FOR OFFICIAL USE ONLY													
W	M	I	T	2	7	0	0	1	0	0	9	3	T/A	C	W											T/A	C	
														1		D	U	P									2	DUP

V. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K087	400	T	D80	
2	K061	14,600	T	D80	
3					
4					
5					
6					
7					
8					
9					
10					
11					
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26					

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F	M	T	2	7	0	0	1	0	0	9	3	T/A	6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground-level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
P. T. Brosnahan General Manager	P. T. Brosnahan	June 5, 1981

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

EPA Form 3510-3 (5-80)

Continued from page 4.

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING *(see page 4)*

Form Approved. OMB No.

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: F M I T 2 7 0 0 1 0 0 9 3 (T/A) 1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*: C | 8 | YR. 56 | MO. 03 | DAY 01

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN: YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | (T/A) 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G	
X-2	T03	20	E	
1	D80	3312	A	
2				
3				
4				
5				
6				
7				
8				
9				
10				

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non—listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158 580004

EPA I.D. NUMBER (enter from page 1): W M I T 2 7 0 0 1 0 0 9 3 | T/A | C | 1

FOR OFFICIAL USE ONLY: W | DUP | T/A | C | 2 | DUP

V. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F016	30,000	T	D80	
2	K061	14,600	T	D80	
3	D005	5,400	T	D80	
4	D008				Included with above
5	D003	400	T	D80	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 2

EPA I.D. NO. (enter from page 1)

F | M | I | T | 2 | 7 | 0 | 0 | 1 | 0 | 0 | 9 | 3 | | |

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more details).

VI. PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground—level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
42 17 00 N	083 12 21 W

VIII. FACILITY OWNER

☒ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
Paul T. Brosnahan	Paul T Brosnahan	11-17-80

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED

V. FACILITY DRAWING (see page 4)